



FRIDAY, JANUARY 31, 1902.

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Contributions

Psychological Railroad Accidents and Their Prevention.

New Haven, Conn., Jan. 25, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE.

An examination of the monthly list of railroad accidents shows that very many of them are due to defective mental action in engineers or signalmen. From the nature of the case they seem to be peculiarly disastrous and unpreventable? No, the danger can be diminished just as the dangers of color blindness and fog are reduced to a minimum. Accidents like the recent ones in Michigan and Schierenberg should be classed as "psychological accidents." They should receive the same careful study as the others and just as much care should be taken to prevent them.

The recent accident in the New York Central tunnel seems to be attributed, by the *Railroad Gazette* (1902, xxxiv., 43, Jan. 17) to a defect of temperament in the engineer. Let me point out that there exist in the psychological laboratories the means of recording many of the factors that go to make up a man's temperament. Quickness and accuracy of perception, clearness and precision of thought under fatigue, ability to maintain a course of action in the midst of distractions, ability to think clearly and precisely in spite of surprise or danger, ability to persist in a course of conduct in spite of temptations to deviate—these can all be measured with a high degree of accuracy. The methods are still those of the laboratory, and no one has ever attempted to modify them so that they can be used to eliminate from the railroad service persons who are defective.

The tests of a candidate should include not only the present elaborate bodily examination by the physician, and the usual crude and not wholly reliable tests for color blindness, sharpness of vision and hearing, but also the even more important study of the person's mental abilities. After all, it is the engineer's mind that runs the train, and his bodily peculiarities are of importance only in so far as they influence his actions.

E. W. SCRIPTURE.

[Dr. Scripture is director of the Psychological Laboratory of Yale University. His experiments in testing for color blindness and other defects of vision, have been reported in the *Railroad Gazette*.—EDITOR.]

"Under Control."

TO THE EDITOR OF THE RAILROAD GAZETTE.

How absurd are these plans about making the Fourth Avenue tunnel into a single block section. Some men cling to what they see through, like an insect to a pane of glass.

Joe Franklin and the other operating officers know well enough that the tunnel accident was not caused in consequence of the tunnel being divided into block sections. They know that even had the tunnel been operated as an absolute block, admitting but one train at a time on each track, still the accident could have happened. They know, too, that it might have occurred on a straight stretch of track, in the open, by day or by night, in fog or sunshine, and that many marvelous hair-breadth escapes from such catastrophes are so miraculous as to

compel the belief that a merciful Providence must have intervened to prevent the impending calamity.

Commuters demand rapid service, and are impatient of delay. Railroad officials endeavor to satisfy those demands by writing rapid schedules, coupled with comprehensive and positive rules to insure safety and prevent delay. Unfortunately, they cannot provide their employees with brains. Rapid movements demand, and short blocks compel, constant vigilance and absolute obedience to rules. The division of the tunnel into short blocks was the result of years of experience by keen-minded railroad officials, as the most feasible to insure safety and prevent congestion of traffic.

If Wisker was competent to haul a passenger train on any part of the main line he was competent to take it through the tunnel. Every runner on the division had at some time to make his initial trip through it. The tunnel was, and is, safe with a brainy hand at the throttle. Franklin cannot stand over every engine driver with an axe to enforce obedience to rules which, if adhered to, would make disaster impossible. Removing the roof of the tunnel would not have made that calamity impossible with the same hand at the throttle. It was the roof of the driver that was at fault. When he found the signals obscured by smoke or steam, instead of drifting through the tunnel under control, with one hand on the throttle, and the other on his brake-lever, anticipating and prepared for trouble, Wisker must have been running his train at high speed; he must have been going at a 30-mile-an-hour gait when he struck. The wreckage was proof that he hit the New Haven train with terrific force. He passed a caution signal which should have caused him to get his train under control at once. At the red signal he should have stopped, whether he could see it or not. That he passed both at high speed without knowing what they indicated only makes his act the more censurable.

But what makes him more criminally culpable than anything else is the glaring fact that he was approaching such an important terminal at high speed, running past signals which he could not see, without having his train under absolute control. Not even the gathered might of heaven could have averted that calamity under such conditions.

LANGDON.

The Winans "Camels" and the Purdue Engine.

Pittsburgh, Jan. 25, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE.

Any one who knew Mr. Ross Winans and was familiar with his engines will, I feel sure, indorse my opinion that, if he were alive, he would promptly and forcibly demand a correction of the article entitled "Another Historic Locomotive at Purdue," which appears in this week's issue of the *Railroad Gazette*. While the matter is not one of substantial importance, it is desirable that all facts of the early history of American locomotives should be stated as accurately as possible, and I am, therefore, moved to call attention to the material error of the article referred to.

The so-called "camel" or "camel back" type of engine, which was original with Ross Winans, from one end to the other, and from rail to top of stack, was an eight-wheel connected engine, and he not only never built a 10-wheel engine, but also was known to be an inveterate and uncompromising opponent of that type. Except as to the form and size of fire-box, there was but little difference between his first "camel," which was built for the Baltimore & Ohio railroad in June, 1848, and which was called the "Camel," afterwards No. 55, and the last which he built for that road (Nos. 210 to 217 inclusive) in February, 1857, and which were known as "long furnace camels." Four more of the same class were built by him in 1860, or shortly before that year, and remained in his shop until 1863, when they, together with a 12-wheel engine, the "Centipede," were purchased by the B. & O. R. R. Co.

About the year 1859, much printer's ink and ill feeling were expended in a lengthy and acrimonious discussion between Mr. Winans and Mr. Henry Tyson, who was at that time Master of Machinery of the Baltimore & Ohio, as to the relative merits of the "camel" and the 10-wheel type of engines, with the result that Mr. Winans never built another "camel" for that road, although, as before stated, the company purchased four of them which he had in stock, when greatly in need of motive power.

All the camel engines had 19 x 22-in. cylinders, eight driving wheels, 43 in. in diam., about a 46-in. boiler, a hemispherical topped dome of about the same diameter located close to the smoke box, an "overhung" fire-box, set behind the rear axle, and as wide as the distance over frames, which stopped in front of it, and a cab on top of the boiler extending from the smoke-box nearly to the fire-box. These were their distinguishing and unvarying characteristics. The earlier or "short furnace" camels had comparatively short straight top fire-boxes, and the latter or "long furnace" camels had longer fire-boxes which were downwardly inclined, as in the later Class I engines of the Pennsylvania railroad, and were provided with feed chutes on top.

The 10-wheel engine which was sent to Purdue was neither a "camel" nor "camel back" engine, nor was it "originated" by Ross Winans, although embodying his design of a cab on the top of the boiler. It was what was known as a "Hayes 10-wheeler," and was designed by Samuel J. Hayes, then Master of Machinery, Baltimore & Ohio R. R., about 1853. The first engine of the type, No. 138, B. & O., was built by A. & W. Denmead & Sons, of Bal-

timore, and was placed on the road in May, 1853. About 16 of these engines were built up to 1857, and the type was revived, and a considerable number built, by John C. Davis, M. of M., about 1868. The engine sent to Purdue was probably one of the latter lot.

The fire-box of this and the other Hayes 10-wheelers was much shorter than that of the camels, as short, in fact, as those of the first "short furnace" camels, and was narrower, as the frames were extended back of it and supported a deck for the fireman, instead of stopping in front of the fire-box as was invariably the case in the "camels." The cylinders were inclined instead of being horizontal as in the "camels," and independent cut-off valves were used, while the camels all had single valves. The engines were originally designed for passenger train service on the 17-mile grade from Piedmont to Altamont, and with the light trains of their day did fairly good work.

Briefly, Ross Winans had nothing to do with the origination or construction of the Hayes 10-wheeler which was sent to Purdue, and it followed his design only as to the location of the cab. In this particular it may be said to be of the "camel" type, but while these engines were sometimes known as "camel 10-wheelers," they were ordinarily and properly termed "Hayes 10-wheelers," and no old Baltimore & Ohio man would think of calling them "camels" or "camel backs," this term being a kind of "trade mark" of the Winans engines.

J. SNOWDEN BELL.

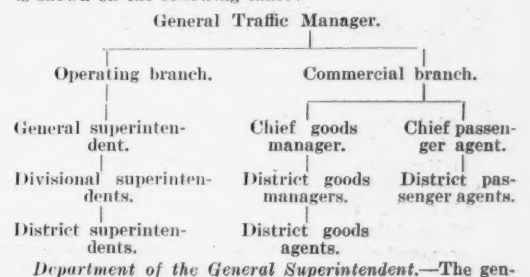
The New Organization of the North Eastern.

The North Eastern Railway of England has decided to reorganize the "traffic" departments of the company and the new plan is described in the *London Railway News* of Jan. 18. We copy the description substantially in full below.

As most of our readers are aware, the term "traffic" on English railroads, includes what we in America call the operating department. It will be seen that by the new arrangement the apportionment of duties and responsibilities will be practically the same as it is on the principal railroads of this country. The general passenger agent is a new officer in England. It will be observed that the terms "division" and "district" are used in a sense exactly opposite to that in which these terms are used by the New York, New Haven & Hartford. The *Railway News* says that the main features of this scheme were devised some years ago and that arrangements have gradually been made to prepare for its introduction; but the directors only approved the new plan at the beginning of the present year. As Mr. Gibb, the General Manager of the North Eastern, has lately visited this country, we may assume that the plan which he now adopts and which is so very much like the plan generally used in America, contains all of the good features which he saw while here; and that American features which do not appear in his scheme have not appealed to him as worthy of imitation.

Hitherto the goods department, inheriting a system which originated when railroad working problems were less technical and perhaps less important than they have since become, has combined with its commercial work the supervision of the working, and of the staff at goods stations and terminal yards, including the loading and unloading and making up of goods trains, and the distribution of goods wagons. The department of the superintendent of the line has been responsible for the running of goods trains and the operations connected with the working of these trains when in transit, but the functions and authority of the superintendent have not extended within the terminal yards.

Under the new organization the superintendent of the line becomes general superintendent, with extended authority. The commercial duties connected with passenger and coaching traffic hitherto performed by the superintendent of the line are transferred to a new department under a chief passenger agent. All the duties connected with the working of traffic hitherto performed by the goods department are transferred to the general superintendent, whilst the commercial duties and the office work connected therewith are retained by the goods department. The district superintendents, of whom there will be nine, will have complete and undivided control, each in his own district, of all working operations connected with all kinds of traffic, passenger, goods, minerals, docks, etc., whilst the district goods managers and district passenger agents will, in their respective districts, attend to the commercial part of the work. Three new posts are created—namely, those of divisional superintendents, in one of which is merged an existing office of mineral manager in one district. These officers will, under the general superintendent, exercise supervision over all the work of the district superintendents. The general scheme of the new organization is shown on the following chart:



eral superintendent is charged with the administration of the department of the company's business connected with the running of trains and the handling and carriage of traffic of all kinds on the company's railroads, docks and wharves. This department includes the following duties: (1) Supervising the safe and proper working of the railroad stations, warehouses, yards, sidings, docks, and traffic appliances. (2) Supervising the loading, unloading and handling of traffic. (3) Fixing the times and traffic arrangements for running all trains and supervising the running thereof. (4) Submitting proposals for the equipment required for trains and for works and accommodation required for traffic of all kinds. (5) Controlling the ordering-out of all locomotive engines for traffic purposes. (6) Controlling the train mileage run to carry the traffic. (7) Controlling the supply and distribution of carriages and wagons. (8) Preparing all time-tables and time bills for issue to the public, and preparing, distributing and issuing to the working staff all time-tables, notices and instructions in connection with the working of the company's railroads and docks and the traffic thereon. (9) Examining and reporting on all applications from traders in connection with private sidings. (10) Dealing with claims under the Workmen's Compensation Act. (11) Supervising the use of the company's telegraphs and telephones. (12) Enforcing the due and proper observation of all rules and regulations of the company in connection with the working of the railroad and docks and the traffic thereon.

Department of the Chief Passenger Agent.—The chief passenger agent is charged with the administration of the department of the company's business connected with securing and charging for passenger traffic and all traffic carried by passenger trains usually known as coaching traffic, including fish carried under fish waybills. This department includes the following duties: (1) Fixing fares and rates for coaching traffic. (2) Preparing, printing and issuing tickets. (3) Canvassing for and securing excursion traffic and all coaching traffic, including supervision of the agencies and receiving offices for dealing with any of this business. (4) Preparing, distributing and issuing all advertisements in relation to coaching traffic, except ordinary time tables and time bills. (5) Distributing and issuing the public time-tables prepared by the general superintendent. (6) Advising the general superintendent as to the train service required for the accommodation of the public. (7) Collecting charges for coaching traffic. (8) Collection and distribution of information as to trade movements and developments, and as to events of a public or private nature likely to affect the company's coaching business, or to require special provision to be made therefor, and submitting proposals with reference thereto. (9) Supervision and control of booking and parcels offices, and of the collection and delivery of parcels traffic. (10) Deal-

of any kind of goods traffic. (13) Dealing with the allotment of coal cells and supervising the coal cell agencies. (14) Controlling the supply, distribution, and repair of sacks provided by the company for goods traffic.

The Electric Train Staff on the C., N. O. & T. P.

In the *Railroad Gazette* of Dec. 6, p. 841, an account was given of the use of the Union Switch & Signal Company's electric train staff apparatus on the Philadelphia & Reading, where it was introduced a few months ago. The improved staff instrument was put in use about the same time on the Cincinnati, New Orleans & Texas Pacific, between Oakdale and Harriman Junction, Tenn.; and Mr. M. W. Maguire, Superintendent of the Chattanooga division of the road, has sent us a diagram, which is given herewith, showing the arrangement of the signals which are used in connection with the staff.

The staff used on this road is made in two pieces, and is called the divided staff. When in use, in the machine at the station, the staff is exactly like that used on the Reading and elsewhere; but when it is delivered to a train it is taken apart; one-half is carried on the engine, and the other on the rear of the train. With this arrangement the delivery of the complete staff at a station affords evidence that the whole of the train has cleared the block section. The piece carried on the rear of the train is the one which unlocks the staff machine.

Referring to the drawing, the semaphore at Oakdale marked "staff" is controlled by a lever which can be unlocked only by the use of the staff, after the same has been taken out of the staff pillar. If a train enters the passing track at Harriman Junction and is to be backed out again at the switch near signal No. 6 the staff must be retained by the conductor for the purpose of unlocking the switch. But if the train is to proceed forward, under signal 9, the staff must be delivered to the signalman in the tower to enable him to unlock that signal.

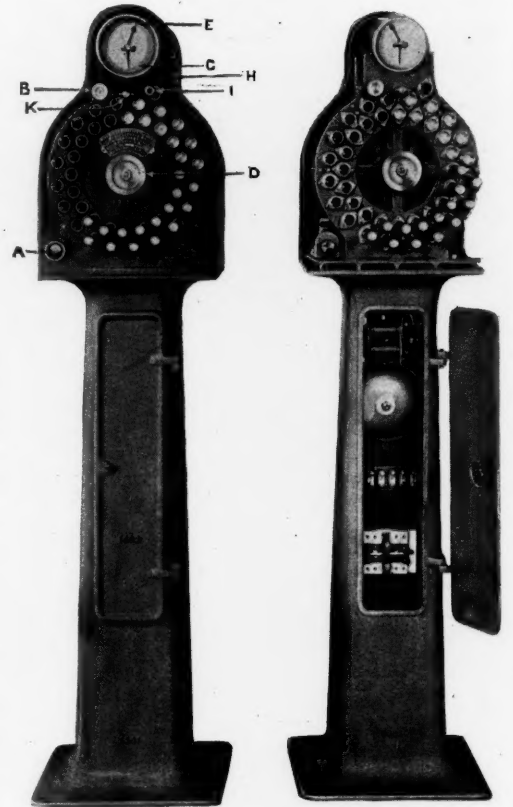
The section from Harriman Junction to Emory Gap is controlled by automatic track-circuit block signals. The signal admitting trains to this section is that marked "electric block" at the extreme right of the drawing. The track-circuit also controls, by an electric slot, signals 7 and 9, so that before a train can leave Emory Gap for Harriman Junction, or whenever a train is in the automatic section, signals 7 and 9 must be in the stop position.

Signals 1 and 2 at Harriman Junction, and the south-bound starting signal at Oakdale, are unlocked by the staff.

Signal No. 7 is for the main line; signal No. 8 governs the route to the Southern Railway. Signal No. 10 governs the route from the passing track, either straight to the track marked "spur," or through both crossovers to the Southern Railway. Signal No. 5 governs from the

The staff or tablet will be delivered to the operator on leaving the block.

The staff or tablet, when received by the operator, must be inserted in the machine and never transferred from one train to another. The staff will be delivered in a rub-



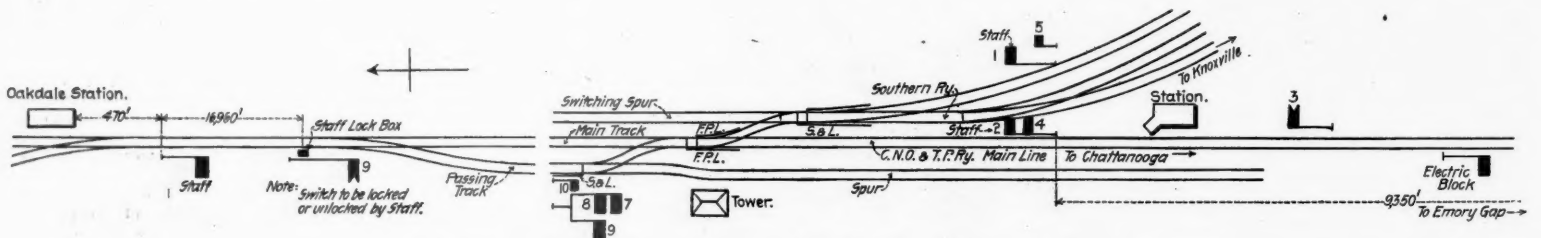
Improved Electric Train Staff Machine.

Made by the Union Switch & Signal Co.

ber case and it must be known, when received, that the staff is in the case.

If the staff apparatus fails, the train despatcher will authorize the movement of trains by the staff telegraphic train order on form No. 27.

When form No. 27 is used the operators at each end



Harriman Junction, Tenn., Cincinnati, New Orleans & Texas Pacific Railway.

The Oakdale Starting Signal is shown at the extreme left.

ing with all claims in connection with coaching traffic. (11) Supervision of trade advertising on company's property.

Department of the Chief Goods Manager.—The chief goods manager is charged with the administration of the department of the business connected with securing and charging for goods traffic, which expression as used herein comprises merchandise, live stock, and mineral traffic, except fish carried under fish waybills. This department includes the following duties: (1) Collection of information as to trade movements and developments and as to railway facilities required by traders and for goods traffic, and submitting proposals with reference thereto. (2) Fixing and quoting rates and charges for all services in connection with goods traffic and keeping all proper rate books. (3) Canvassing for and securing goods traffic. (4) Preparing and despatching invoices or obtaining declarations of all goods traffic loaded for carriage. (5) Collecting charges for goods traffic, except charges for certain mineral traffic collected by the accountant. (6) Advising the general superintendent as to the accommodation and train services required for goods traffic. (7) Supervision and control of goods agents and station masters in relation to their commercial duties in connection with goods traffic. (8) Dealing with all claims in connection with goods traffic. (9) Cartage of goods traffic, and supervision of cartage staff and plant. (10) Examining and reporting on all applications from traders in connection with private sidings in regard to questions of rates or charges, and keeping records of all particulars in regard to private sidings. (11) Examining and reporting on all questions in regard to the routing of and division of receipts for through goods traffic. (12) Preparing and issuing notices as to carriage of live stock traffic in districts affected by cattle disease, and similar special notices affecting the carriage

Southern Railway to the switching spur or to the passing track. The rules under which the staff is used are as follows:

All rights conferred by Time-Table or Book of Rules will be void, except that the rule governing Oakdale yard will remain in effect. Conductors will deliver register of their trains to operator at Harriman Junction.

Trains must not enter the staff block until they have possession of the staff or tablet and the proceed signal is displayed. The possession of a staff confers the absolute right of track over all trains in the block, except as per yard limit rule.

One-half of the staff will be received by, carried on and delivered from the head end of the train, and the other half will be received by, carried on and delivered from the rear end of the train. The complete staff will be received and delivered by light engines.

The possession of a permissive tablet confers the right of track through the block only in the direction of the train's destination, and the train must run the entire length of the block.

The permissive tablet will be used only when necessary to move more than one train in the same direction through the block at one time, and only by authority of the Chief Train Despatcher. It will not be used to move passenger trains.

The tablets will be received, carried and delivered the same as the staff. One tablet will be received on the front end of each train, except the last, and the last train will receive, on the front end, all the remaining tablets chained together, and the staff on the rear end. If the last train is a light engine, it will receive all the remaining tablets and the staff chained together.

If a train parts in the block, the staff, or tablet, must be retained by the trainmen until the entire train is clear of the block.

of the block must know that all the staffs are in the machine, and so report to the chief train despatcher.

Copies of 27 orders that have been used by conductors and enginemen will be delivered to the operator in the same manner as the staff, and he will forward them to the superintendent.

Code of Bell Signals.

To attract attention—Two taps, thus --
Unlock my machine—Three taps, thus ---
Wait, cannot unlock now—Four taps, thus ----
Train has passed into the block, two taps, two taps, two taps, thus -----
Train has passed out of the block, two taps, two taps, two taps, one tap, thus -----
Testing staff bell, eight taps, thus -----

Automatic Signals on the Cincinnati, New Orleans & Texas Pacific.

[WITH AN INSET.]

In connection with the foregoing account of the use of the electric train staff, Superintendent Maguire has sent us a sketch showing the arrangement of the automatic signals on the Chattanooga Division of his road; and the same is shown on the inset given in this issue. This line is of interest as the first signal-track road in the country to be extensively equipped with automatic block signals designed to give indications for trains moving in both directions. The existence of an unusual number of tunnels on the line, as well as many curves, necessitated unusual measures for the protection of trains. Three kinds of signals are used, the clockwork disk, turning on a vertical spindle, the electric disk (enclosed), held in the all-clear position by an electro magnet, and the electric

semaphore, worked by an electric motor. The different kinds of signals are indicated by characteristic signs on the drawing. This drawing does not show interlocking plants. The sketch showing the alignment of the road is not intended to show the curvature graphically; the degree is indicated in each case by figures.

The Atlantic Type Locomotives of the Chicago, Milwaukee & St. Paul.

The new wide fire-box Atlantic type locomotives of the Chicago, Milwaukee & St. Paul, which were illustrated in our issue of Sept. 20 last, are now in regular service between Chicago & Milwaukee hauling trains with a maximum weight of 977,360 lbs. These are Vaucain compounds weighing approximately 170,000 lbs., with 90,000 lbs. on the drivers. They have 15 and 25 x 28-in. driving wheels, 84-in. drivers, 3,198 sq. ft. of heating surface, 40 sq. ft. of grate surface, and they carry 200 lbs. steam pressure. The tender in working order weighs about 120,000 lbs. On several occasions these locomotives have made some fast runs, notably on last New Year's eve. Then one of these Atlantic type engines hauled the "Fast Mail" from Chicago to Milwaukee in 87 minutes, elapsed time; the distance being 85.2 miles. This train consisted of five cars weighing 421,300 lbs. behind the tender. There is an arbitrary time limit of 10 minutes for the first 2.8 miles out of Chicago, and of five minutes for the last 0.8 mile at Milwaukee. Further on the run in question, it was necessary to slow down to 25 miles an hour at four railroad crossings. It follows that at times this train was running at high rates of speed. It is reported that 19 miles between Wadsworth and Western Union Junction were made in 16 minutes, or at the rate of 71 miles an hour.

The Proposed Tunnel Loop at the Grand Central Station.

The plan printed herewith shows the arrangement proposed for changing and enlarging the suburban terminal at the Grand Central Station to fit it for electric working. At Fifty-seventh street the existing subway is to be widened out to give room for four additional tracks. This will be accomplished by a change in the location of Park avenue, as shown by the shaded area, on the west side of the subway from Forty-ninth to Fifty-sixth street. The lots of property recently acquired by the New York Central in view of these changes are indicated by hatched boundary lines. The property already owned by the company is indicated by heavy, solid boundary lines.

It will be seen that the outer tracks in the existing tunnel will run off on the outer tracks of the new tunnel and make a continuous loop, turning at Forty-third street and again going north. This loop track is shown by double arrows and it will be used for through express and suburban trains which do not lie over at the Grand Central terminal.

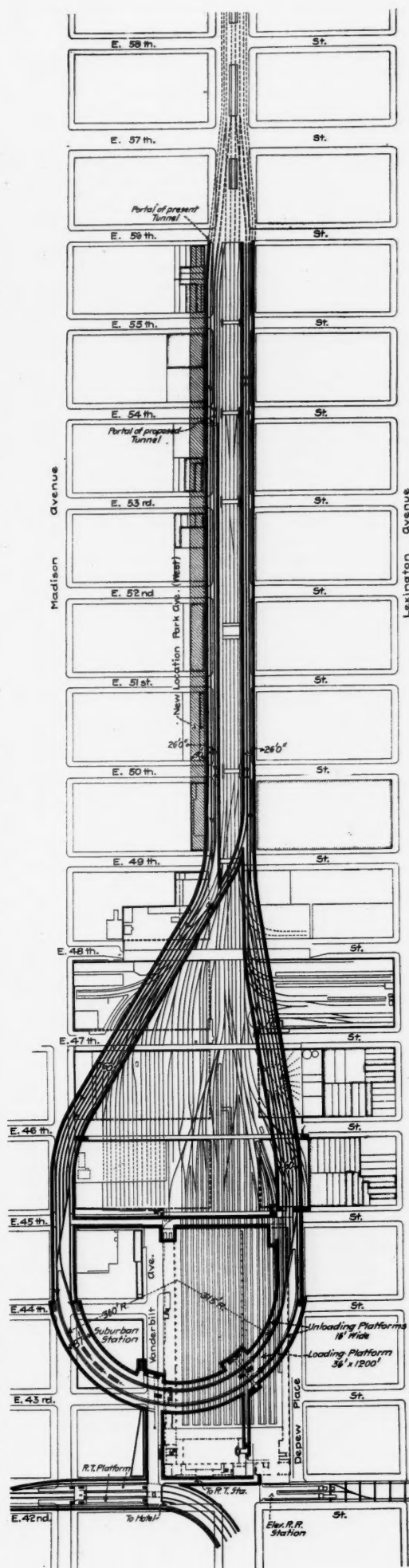
Inside this track will be noticed another loop track marked with single arrows. This will be used by suburban trains that may lie over at the Grand Central terminal on the storage tracks, of which a number are provided for in the loop; in fact, standing room is provided for 78 cars on these storage tracks. Still other tracks will be seen on the plan, marked with double arrows, indicating movement in both directions. These portions of the tracks may be used for switching movements.

Of course, it is understood that all of these new tracks are below the present yard level and will leave the existing arrangements as they now stand or free for any subsequent modification that may be found desirable.

The loop has a radius of 360 ft. for the center line of the outside track. Very ample platform space is provided. On the loops the platforms are 1,200 ft. long. On the outside of the outside loop is an unloading platform 16 ft. wide. Between the two loops is a loading platform 36 ft. wide; and finally inside the inner loop is an unloading platform 16 ft. wide. There is communication from these platforms to the general waiting room in the present head house; also to the suburban station to be built west of Vanderbilt avenue, between Forty-fourth and Forty-third streets; and to the Rapid Transit Elevated Railroad platforms. There are also exits directly to the streets.

Along Forty-fifth street is a subway, now existing, reaching from Depew Place to Vanderbilt avenue, that is, right across and beneath the present yard. This subway now has 12 hydraulic elevators, one on the line of each platform, for handling baggage. This subway will be continued west to connect with the new route, permitting the easy exchange of baggage between through and local trains. The north wall of this subway, as shown on our plan, is wrong, as the recesses for the elevators should have been indicated.

It is hardly necessary to say that the proposition is to work the electrical service on the two outside tracks of the existing Park avenue tunnel, the center tracks remaining for through steam service on the present level. In general there will be a continuous movement of the trains right around the loop, but provision has been made for trains to lie over in the local storage yard. Such trains will take the inside loop track marked with the single arrows, and after discharging passengers will go



Proposed Tunnel Loop at the Grand Central Station.

The heaviest lines show the walls of the tunnel. The tracks are shown by center lines, the new electric tracks being heavier than the existing tracks. Old property lines of the New York Central are heavy full lines; property lately acquired is bounded by hatched lines. The subway across the yard at Forty-fifth street should show recesses in the wall for twelve elevators, which now exist.

to the easterly yard and thence be switched across into the westerly yard, whence they may be moved out on to the express tracks (marked with the double arrows pointing in one direction) without moving against the traffic. In other words, these cars may at any time be moved into the stream without moving against it.

It will be seen that no physical connection of the New York Central tracks and the Rapid Transit tracks is contemplated under this scheme; in fact, there is a difference of 8 ft. in the level which it would not be easy to overcome even if that were desirable, and there are many reasons why such a connection is not desirable.

The Isthmian Canal.

BY W. H. BURR.

In the February issue of *Scribner's Magazine* appears a valuable article by Prof. Burr on the Isthmian Canal projects. He reviews, briefly, the history of the various projects and attempts and gives us a good summary of the physical conditions and features of the Panama and the Nicaragua Canal routes and proposed canals. He writes from the standpoint of a member of the Isthmian Canal Commission and, therefore, must be duly guarded; but his article has a special interest as giving the personal views of one of the commissioners more freely than they could be given in the report. We have room only for his summing up. It must be remembered that this article was written before the change of heart of the New Panama Canal Company.

It is not improbable that the requirements of our Pacific-coast commerce and industries may demand an Isthmian canal either with tolls just sufficient to pay costs of operation and maintenance, or, possibly, without tolls. The expenses to be incurred annually, therefore, in the operation and maintenance of the canal after completion constitute an item of gravity. The Commission made a most careful study of this feature. Its estimates were \$3,350,000 for the Nicaragua route, and \$2,000,000 for the Panama route, exhibiting a less annual cost of operation and maintenance in favor of the Panama route of \$1,350,000, which should not be lost sight of in the comparison of the two crossings.

The Commission sums up the cost of constructing the canal on the Nicaragua route and of completing the Panama Canal, excluding the costs of acquiring both the concessions from the different governments and the rights and property of the New Panama Canal Company, as follows: Nicaragua, \$189,864,062; Panama, \$144,233,358.

The New Panama Canal Company has estimated the value of its rights and property at \$109,141,500, but the Commission estimates the value of the same rights and property at \$40,000,000. If the former sum be included, the total cost of completion of the Panama Canal and the acquisition of the rights and property of the New Panama Canal Company would be \$253,374,858. This is the amount which must now be compared with the preceding estimated cost of the Nicaragua Canal.

In order to determine the total estimated cost of the Isthmian canal by either route, there must be added to the preceding figures the costs of securing the requisite concessions from the Colombian Government in the one case, and from the governments of Costa Rica and Nicaragua in the other, as there are at present neither concessions from nor treaties with any of those countries of sufficient scope or in terms suitable or adequate for the completion of the canal.

Concise stating the situation, its main features may be expressed somewhat as follows:

Both routes are entirely "practicable and feasible."

Neither route has any material commercial advantage over the other as to time, although the distance between our Atlantic (including Gulf) and Pacific ports is less by the Nicaragua route.

The Panama route is about one-fourth the length of that in Nicaragua; it has less locks, less elevation of summit-level, and far less curvature, all contributing to correspondingly decreased risks peculiar to the passage through a canal. The estimated annual cost of operation and maintenance of the Panama route is but six-tenths that for the Nicaragua route.

The harbor features may be made adequate for all the needs of a canal by either route, with such little preponderance of advantage as may exist in favor of the Panama crossing.

The Commission estimated ten years for the completion of the Panama Canal and eight years for the Nicaragua waterway, but the writer believes that these relations should be exchanged, or at least that the time of completion for the Panama route should not be estimated greater than for the Nicaragua.

The water-supply is practically unlimited on both routes, but the controlling or regulating works, being automatic, are much simpler and more easily operated and maintained on the Panama route.

The Nicaragua route is practically uninhabited and consequently practically no sickness exists there. On the Panama route, on the contrary, there is a considerable population extending along the entire line, among which yellow fever and other tropical diseases are probably always found. Initial sanitary works of much larger magnitude would be required on the Panama route than on the Nicaragua, although probably as rigorous sanitary measures would be required during the construction of the canal on one route as on the other.

The railroad on the Panama route and other facilities offered by a considerable existing population render the beginning of work and the housing and organization of the requisite labor force less difficult and more prompt than on the Nicaragua route.

The greater amount of work on the Nicaragua route, and its distribution over a far greater length of line, involve the employment of a correspondingly greater force of laborers for an equally prompt completion of the work.

The relative seismic conditions of the two routes cannot be quantitatively stated with accuracy, but in neither case are they of sufficient gravity to cause anxiety as to the effects upon completed canal structures.

Concessions and treaties require, to be secured and negotiated for the construction of the canal on either route.

Annual Report of the Interstate Commerce Commission.

The Commission has sent out a synopsis of its fifteenth annual report, which has just been transmitted to Congress. Extracts follow.

The twenty-first section of the act to regulate commerce imposes the specific obligation of recommending to the Congress such additional legislation "as the Commission may deem necessary." The Commission has nothing new to propose, because the subject has been fully discussed in previous reports. Recommendations, both general and specific, have been repeatedly made. The reasons for urging these amendments have been carefully explained, and repetition of the argument at this time can hardly be expected. The statements of former years apply with added force to the present situation.

Referring to recent investigations made into the movement of packinghouse products and the movement of grain and grain products, the Commission says that the facts therein developed are of such a character that no thoughtful person can contemplate them with indifference. That the leading traffic officials of many of the principal railway lines, men occupying high positions and charged with the most important duties, should deliberately violate the statute law of the land, and in some cases agree with each other to do so; that it should be thought by them necessary to destroy vouchers and to so manipulate bookkeeping as to obliterate evidence of the transactions; that hundreds of thousands of dollars should be paid in unlawful rebates to a few great packinghouses; that the business of railroad transportation, the most important but one in the country to-day, paying the highest salaries and holding out to young men the greatest inducements, should to such an extent be conducted in open disregard of law, must be surprising and offensive to all right-minded persons. Equally startling at least is the fact that the owners of these packinghouses, men whose names are known throughout the commercial world, should seemingly be eager to augment their gains with the enormous amounts of these rebates which they receive in plain defiance of a Federal statute. These facts carry their own comment, and nothing said by us can add to their significance.

The Commission is not unmindful of the palliating circumstances under which railroad traffic officials act. These have been fully stated in previous reports, and the Commission has stated in that connection what, in its opinion, is the proper remedy. We certainly believe that existing laws should be so amended that railroad managers who desire to observe them can do so without risk of sacrificing their property.

But we also believe that the application of this remedy is fraught with certain dangers and that it should not be applied unless the public is fully protected against those consequences, and that the public as well as the railroads, and even more than the railroads, requires at the present time adequate protection; that in view of those great combinations which have been formed and are now forming, by which railroad competition, which upon the present theory of this law is greatly relied upon to secure just and reasonable rates and facilities, will be largely eliminated, some method should be provided by which the government can exercise in fact that control over rates which it possesses and which many persons suppose that it now exerts.

If it is not possible to amend this law in its more essential features, it ought at least to be possible to deal with the coercive features of the act. While it was undoubtedly the intent of the tenth section of the act to impose a penalty upon the corporation it has been judicially determined that the agent alone can be punished. Now, the object of rate cutting is to get business and make money, and the corporation, if anyone, profits by the illegal act. It is the real offender, and ought certainly to pay the penalty as well as its officer. It is anomalous and unjust that the representative or employee only should be liable to prosecution. To convict for paying a rebate it is necessary to show not merely that the railroad paid a rebate to a particular shipper, but also that it did not pay the same rebate to some other shipper. As a practical matter this is almost always impossible. For this reason prosecutions otherwise sustainable can rarely be successful; and this is particularly the case where there is an extensive demoralization of rates, and consequently the greatest need for the application of criminal remedies. Departure from the published rate is the thing which can be shown and the thing which should be visited with fitting punishment.

The twentieth section should be amended so as to open the books of the carriers to the inspection of the Commission or its agents. Such publicity would be of the greatest service in exposing and punishing illegal practices of this kind, and it is difficult to see any good reason why this ought not to be permitted, provided proper restrictions are put upon the use to be made of knowledge thus obtained.

These amendments would not afford any satisfactory system for the regulation of interstate railroads, but they probably would stop such gross infractions of law as now frequently occur.

We wish to still further suggest that if the powers of this Commission are not to be generally enlarged, some method should at least be devised by which such orders as it can make may be enforced within a reasonable time.

Packinghouse Products.—The recent investigation of packinghouse products showed that rates below published tariff charges had been applied both east and west of

Chicago. East of Chicago the dressed-meats tariff had been cut from 3¼ to 5 cents per 100 lbs., and 5 cents on export provisions. On some of the lines the vouchers and other evidences of these illegal rates were destroyed soon after the transactions were completed. West of Chicago the rates on these products were from 2 to 5 cents lower than the published tariff. One line made a contract to carry this traffic for a year from Kansas City to Chicago at 5 cents below the tariff then in force. All other lines must, of course, make the same rate. These lines west of Chicago made no distinction between export and domestic business. Sometimes rebates were paid, sometimes the freight was billed at the cut rate, and sometimes the published rate was reduced when the freight money was paid. The Commission required the carriers to file statements showing the number of cars shipped and the rates actually charged. When these are received the gross amount of the rebates can be determined; at present it can only be said to reach hundreds of thousands of dollars. While the general public probably receives some benefit from these lower rates, in the main these sums swell the profits of the packers. These great concerns number only about five or six, and little distinction in the rates appears to have been made between them. The effect is to give them an enormous advantage over smaller competitors located at other points. Already these competitors have mostly ceased to exist. These disclosures afford a pregnant illustration of the manner in which secret rate concessions are tending to build up great trusts and monopolies at the expense of the small independent operator.

Rates on Export Wheat and Flour.—The carriers east of Chicago have made no serious pretense of maintaining the export rates on wheat, and it appeared that the carriers had agreed among themselves upon a rate from Chicago 2½ cents below the published tariff. This did not apply from intermediate points. If this agreed rate on wheat and the published rate on flour were both maintained, a discrimination of from 2½ to 4 cents on flour resulted. The Commission thinks, on the whole, that neither of them was absolutely maintained. Concessions were made according to the exigencies of the case. The entire profit in grinding export flour would not ordinarily equal 4 cents per 100 lbs. From Buffalo to New York the roads make a very low rate upon ex-lake wheat, but do not make a correspondingly low rate on export flour. To an extent, therefore, the rail carriers are responsible for the higher lake and rail rate on flour; but after all has been said it is evident that in this water competition inheres a condition which, during a considerable part of the year, if given its natural result, must secure a somewhat better rate to export wheat than to the manufactured product.

Wheat in the region tributary to Kansas City may be exported through Galveston or New Orleans, or through Atlantic ports. The distance to the Gulf ports is much less than the distance to the eastern seaboard. Active competition exists between the lines leading in various directions from Kansas City, and this has resulted in very low rates on wheat from that section, but these rates have not been observed. The open wheat tariff from Kansas City to Chicago has been 12 cents and the actual rate as low as 5 cents. To Galveston the export rate has been 15 cents and the domestic rate 37 cents. Export flour does not move at all through Galveston and only in comparatively small quantities through New Orleans. The competition, therefore, which produces so marked an effect upon wheat is not felt in the case of flour. It did not appear just what the actual flour rate from Kansas City to Chicago had been, but it was doubtless considerably above the wheat rate.

Another manifestation of this competition in the West is seen in the practice of allowing some particular individual to handle practically all the grain transported upon a particular railroad. Some one individual purchases substantially all the grain which is handled by a given line of railroad, and the claim is made, and the inference is almost a necessary one, that this individual must receive concessions which enable him to underbid other buyers in the same market.

The following conclusions are stated by the Commission:

First. At the present time grain and grain products move from points of origin to the seaboard generally upon secret rates. This is entirely true of that portion which is exported, and in the main true of domestic traffic.

Second. The effect of these secret rates is to discriminate in favor of the foreigner, to give preferences to particular shippers, to exclude from business the small operator. Until there is a published rate which is accorded to all shippers alike it must be impossible to determine whether the rates enforced are just or unjust.

Third. These rate discriminations militate against a great American industry. To an extent the rate upon flour to the foreign market must be higher than that upon wheat. This is decreed by physical conditions which no statute and no commission can alter. To that extent this industry must expect to operate at a disadvantage. But many of the present discriminations are unnecessary; and here again it never can be known to what extent they are just or unjust until it is first known what rate this traffic actually bears.

Traffic Associations.—These secret rates from Chicago to the seaboard were referred to by the witness as "agreed" rates. The railroads had by concerted action agreed to make and maintain such rates. Further inquiry developed the fact that these roads, together with many others, were members of the Central Freight Association,

and that this association determined the competitive rates within its territory. It was claimed that each road was in theory at liberty to put in whatever rate it saw fit, but practically the rates recommended by the association were always adopted. What is done in this section, by this association is accomplished in other sections by other associations.

It is not the business of this Commission to enforce the anti-trust act, and we express no opinion as to the legality of the means adopted by these associations. We simply call attention to the fact that the decisions of the United States Supreme Court in the trans-Missouri and Joint Traffic Association cases have produced no practical effect upon the railroad operations of the country. Such associations in fact exist now as they did before those decisions, and with the same general effect. In justice to all parties we ought probably to add that it is difficult to see how our interstate railroads could be operated with due regard to the interest of the shipper and the railroad without concerted action of the kind afforded through these associations.

Complaints.—The great mass of complaints are disposed of by preliminary investigation and correspondence or conference with carriers and shippers. The matters acted upon in this way are of the same nature as those which find their way to the regular case docket of the Commission. Undoubtedly many more formal proceedings would be instituted if the Commission possessed authority to deal effectively with these violations of the law. The instances are frequent where complaining parties have not filed formal complaints, though apparently warranted in taking that course by facts developed in preliminary investigations. Such failure on the part of complaining shippers to prosecute their cases in the way provided in the statute can only be ascribed to lack of confidence in the power of the Commission to afford relief.

The total number of proceedings during the year was 340, formal and informal. One hundred and forty-nine informal complaints were settled through preliminary investigation. Nineteen formal proceedings have been instituted, involving rates and practices of 63 carriers and two telegraph companies.

Court Decisions.—The only court decisions rendered during the year upon orders issued by the Commission were in four long and short haul cases—two in the United States Supreme Court, and one in the Fifth Circuit Court of Appeals, and one in the Circuit Court, Northern District of Alabama. These decisions are explained in the report. A case decided by the Supreme Court of Tennessee seems to intimate an understanding that the publication of joint rates of connecting carriers, under the general order of the Commission directing publication of such rates, involves previous approval of such rates by the Commission. The legality of these rates does not depend upon approval by the Commission.* Eleven civil cases are pending in the Federal Courts to enforce orders of the Commission.

Statistics.—The report includes an abstract of the preliminary report for the year ending June 30, 1901, prepared by its statistician. This includes 99 per cent. of the mileage that will be covered by the final report. The passenger earnings were \$426,909,210; freight, \$1,114,740,770; total, \$1,578,164,205, or \$8,211 per mile of line. The operating expenses amounted to \$1,023,156,281, or \$5,323 per mile of line; net earnings \$555,007,924, or \$35,577,218 in excess of their earnings during the fiscal year 1900. The total income of these roads, including \$65,271,244 received from investments and other sources was, \$620,279,168.

The total deductions from income, not including dividends, were \$421,625,796. In this amount are included interest on bonds, rents for leased lines, betterments charged to income, taxes (which were \$47,041,214), and other miscellaneous charges. Dividends amounted to \$121,108,637. The surplus from operation was \$77,544,735.

Ten-Year Book.—The Commission has in preparation a Ten-Year Book on Railways in the United States, the design of which is to show the results of railroad operation, as also the conditions under which railroad property has operated since publication of the volume on transportation by the census of 1890. In addition to condensed tables taken from the annual reports, this publication will contain a statement of the statutory provisions of the States and of the Federal Government, so far as these pertain to the taxation of railroad property, to the organization and administration of railroad commissions, and to such other laws as limit, direct, and control the business of transportation by rail. The compilation of railroad traffic prepared for the Senate Committee on Finance, and published by that committee in 1893, has been amplified and brought down to date. The tendency toward organization for the purpose of uniformity in administration, so far as this is represented by associations among railroad officers and employees, finds place in this publication, as also a chapter upon railroad bibliography and the railroad press during the past 10 years. The statistical exhibits are a continuation of the exhibit in the census volume on transportation, thus providing a series of statistical tables uniformly compiled for 20 years.

Safety Appliances.—The safety-appliance law became fully effective Aug. 1, 1900, and the beneficial results of its operation are now being realized. The greatly im-

*A number of other court decisions are mentioned in the report. These we shall refer to in a future number.
EDITOR RAILROAD GAZETTE.

creased security to life and limb with which the men on freight trains and in freight yards now perform their work is now apparent on every hand. Evidence of the improved conditions appears in the records of accidents in the testimony of railroad officials and employees, and in the records of the railroad claim departments, as well as in those of the several trainmen's associations.

The inspectors employed by the Commission are competent men of long experience. The report shows that for the year ending June 30, 1901, the number of employees killed in coupling accidents was less than in the preceding year by about 35 per cent., and the number injured was less by about 52 per cent. The number of persons killed or injured by falling from trains and engines increased. The causes for this can only be conjectured. With the use of air-brakes on freight trains it is confidently expected to lessen the deaths and injuries under this head. Air-brakes were not nearly as generally used in 1899 and 1900 as they are now. It is pointed out, however, that with more powerful locomotives, heavier cars, and longer freight trains the use of air-brakes on these trains has been the occasion of an increased number of violent shocks, which tend to increase the danger to men on the cars.

The Commission recommends that the law be amended so as to specifically require the application of automatic couplers and "handholds" on all vehicles, passenger, freight, and miscellaneous, which are hauled or propelled by standard locomotives.

The Commission recognizes that as a rule the railroad companies now need no compulsion to induce them to use automatic couplers, and that it is only in details of a minor character that any road has assumed a critical or reluctant attitude. Both the automatic coupler and continuous power brake are now absolute necessities in the operation of roads which move long trains, or use the powerful locomotives and heavy cars which are now common. Thus the policy of Congress in enacting the safety-appliance law is amply vindicated on what may be called business considerations, without regard to the question of safety of life and limb.

Attention is called to the dangerous use at the present time of old and weak cars in nearly all trains. This has largely been caused by the great expansion of business, but it is reasonable to expect that every well-managed road will do away with this element of danger as fast as is practicable. The action of the American Railway Association in recommending the adoption of a standard size for box freight cars is noted and commended.

The rules adopted by the Commission for the government of its inspectors are appended to the report. These rules have been widely distributed and have come to be largely used by the railroads themselves. About 30,000 copies have been sent out to railroads at the request of the Master Car Builders' Association. The appendix to the report also contains a table summarizing the results of the inspections made by the Commission. For the year ending June 30, 1901, the five or six inspectors employed examined about 98,600 cars. The results of these inspections are discussed with some detail. Attention is called to defects in couplers, uncoupling mechanism and triple valves. Especial reference is made to the breakage of the "knuckle" on couplers, which often results from the fact that slots and holes are still left in the knuckles for the purpose of coupling with the old-fashioned link and pin, thereby diminishing the strength and security of the knuckle and of the coupler as a whole.

Railroad officials complain of rough handling of cars in yards. This is due to the general use of automatic couplers, it being possible to quicken the work of switching. This condition is regrettable, not only on account of damage to the cars, but because it produces an element of danger to the men. The breakage of a timber or loosening of a bolt or other fastening may not be discovered until it has caused a derailment while running on the road at high speed. The remedy for this fault lies chiefly in better discipline of the men while handling the cars.

The Commission says that the air-brake on freight trains has long been in need of a decided improvement. Trains have often been run with only a few cars air-braked, when, but for insufficient inspection, a larger number could have been made available. A harmful practice, apparently on the increase, is the pulling one car away from another without disconnecting the hose couplings. The hose is strained and frequently loosened; this introduces an element of constant danger while trains are running. The retaining valve is, on every steep grade, a necessity, but it appears that only a few roads have as yet made regular and systematic use of these valves.

Another cause of unsatisfactory service is found in deficient arrangements at yards for testing the brakes. The running of trains partially air-braked is a practice which is still tolerated everywhere. Some companies, particularly in the East, are still controlling trains on steep descending grades by the use of hand brakes. This is in disregard of the lessons of experience on many roads in the West, and is contrary to the advice of expert engineers. An object of the safety-appliance act was to provide for the universal use of continuous power brakes on all trains, and it is the purpose of the Commission to pay particular attention to this feature. Reference is made to letters in the appendix from officers of railroad companies and trainmen's brotherhoods, testifying to the good results of the law.

Accident Reports.—By the act of March 3, 1901, the

Commission is required to gather statistics of collisions and derailments and of accidents to passengers and to employees on duty. Although ample notice was given, a number of companies failed to file their reports for the first month (July, 1901), within the time specified, and in fact have not yet submitted them; and for that reason the statistics for the first month have not yet been fully tabulated. One reason for this appears to be that the companies in question had not before kept their accident statistics in a form readily adaptable to the Commission's form. These difficulties have been or will be corrected. The Commission intends to tabulate and collate the information contained in the reports, and to issue bulletins showing the principal facts.

Some classes of accidents, including many personal casualties in which the person injured is himself chiefly at fault, may be looked upon as unavoidable. On the other hand, many of these injuries, fatal and nonfatal, are in some degree preventable by care; and the Commission will present such lessons as may appear to be deducible from the reports it receives. The Commission has taken ample precautions to prevent the reports received from the various carriers being used for the benefit of private interests. This law is deemed defective because the monthly reports are limited to accidents to employees and passengers, and do not include casualties to other persons. The latter are covered, or intended to be, by the annual reports to the Commission under the twentieth section of the act to regulate commerce; but it is believed that reports under the recent law should embrace all railway accidents resulting in death or personal injury, so that this subject can be omitted from the annual reports; and the Commission recommends an amendment to accomplish that purpose.

A Big Eye-Bar.

The engraving is from a photograph of what is doubtless the largest eye-bar ever made. It was forged at the shops of the Phoenix Bridge Company and broken in their 1,000-ton testing machine. These bars were made for the 1,800-ft. cantilever bridge over the St. Lawrence River at Quebec. The bars are 15 in. x 2 in.; the eye is 32 in. in diam., the pinhole 12 in. In testing, the bar developed an ultimate strength of 50,160 lbs. per sq. in., and 28,000 lbs. per sq. in. elastic limit. The elongation in 8 ft. was 25.63 per cent., the elongation of the pinhole, 5.26 in.; the reduction of the area at the fracture was 52.9 per cent. It broke in the body of the bar, with a silky fracture.



The Railroad Y. M. C. A.

The twenty-sixth annual meeting of the Railroad Branch of the Young Men's Christian Association, at Madison Avenue and Forty-sixth street, New York City, was held on the evening of Jan. 14. A brief notice of the meeting, with extracts from the speech of Mr. Andrew Carnegie, was given in our last issue. The annual report of Secretary George A. Warburton contains numerous items of interest concerning the Young Men's Christian Association, on other roads than the New York Central, and throughout the country, and we give below some extracts from this report:

"There are 170 railroad branches of the Young Men's Christian Association in the United States and Canada, with a membership of more than 43,000 and an annual expenditure of more than \$400,000, of which sum the railroad corporations contribute about 50 per cent. Seventeen branches are located on the line of the New York Central, and they have a membership of 7,461. This branch (New York) has a membership of 2,392. The Madison Avenue Department alone (a part of the 'Branch') has a larger membership than any other railroad branch in the country.

"The classification of our membership is as follows:

Office men	843
Train service men	1,166
Others	383
Total	2,392

"The total amount received for dues during the year was \$6,772.

"During the past year 15 buildings were erected for the use of railroad associations, 75 per cent. of their cost being contributed by railroad companies, the balance by the employees. The New York Central has been a firm friend from the beginning. Rapid development is now being made on other systems, notably the Gould lines, where during the past three years more than \$66,000 have been contributed toward the erection of buildings; and during the past year more than \$10,000 toward the current expenses. On the Pennsylvania East of Pittsburgh there are now 17 railroad associations with a membership of 5,000, to which the Pennsylvania Railroad Company contributes 60 per cent. of the cost of operating, or about \$26,000. A gift of \$35,000 was recently announced by that company to erect and furnish a building at Pitcairn, near Pittsburgh. The Boston & Maine, the Grand Trunk, and Chesapeake & Ohio, are among

the other railroad companies whose support is most cordially given. Great credit for this extension is due to the International Committee, who, through their traveling secretaries, keep the entire movement in unity and promote its growth and extension.

"The daily average attendance at Madison Avenue has been 763. This building reaches the men in the passenger train service, the clerks in the general offices, the yardmen of the Grand Central Station, as well as the railway postal clerks, Pullman and express employees. The sleeping rooms were used 25,309 times; 21,376 baths were taken; the restaurant did a business of \$38,491, on which there was a small profit; 192,792 meals were served. Both here and at the other restaurants the increased cost of food supplies was felt.

"At Mott Haven the John M. Toucey Memorial Building will be dedicated on Sunday, Jan. 19. The cost of the building and lot is covered by the gifts of Mrs. John M. Toucey and the New York Central & Hudson River Railroad Company and Mr. Cleveland H. Dodge, the President of the Young Men's Christian Association.

"All our buildings are open night and day. The railroad companies have contributed (to the work in New York City) \$7,017; other subscriptions have amounted to \$1,205. The receipts from membership dues were \$6,772. The members bear an increasing proportion of the expenses."

The handsome building for the use of the Railroad Y. M. C. A., at Corbin, Ky., was opened on the evening of Jan. 10. The dedicatory exercises were participated in by the general manager and other officers of the Louisville & Nashville.

A new railroad branch of the Y. M. C. A. has been established at Richmond, Va., in the Main Street Station. This station is the passenger terminal of the Chesapeake & Ohio and the Seaboard Air Line.

Mr. J. M. Dudley, heretofore at the Dearborn Station, Chicago, has been appointed General Secretary of the Y. M. C. A. on the lines of the Brooklyn Rapid Transit (electric railroad) Company.

New Car Shops at Niles, Ohio.

The new shops of the Niles Car & Manufacturing Co., Niles, Ohio, described in our issue of Nov. 20 last, are now in full operation. A considerable force of skilled car builders from various parts of the country has been secured and work has begun on the first regular orders received.

In addition to the list of officers and heads of departments, recently printed in these columns, appointments have been made as follows: A. W. Shaw, Assistant Superintendent; John Meek, Foreman Paint Department; Frederick McBrien, Mill Foreman; W. F. Ray, Foreman Construction Department, and Don M. Campbell, Chief Draughtsman.

The company is installing additional machinery as fast as possible and the plant is already a busy place. Some of the orders recently given to the company are as follows: Aurora, Elgin & Chicago Electric Ry., 30 45-ft. motor cars; Western Ohio Ry. Co., 20 45-ft. closed motor cars, and four 44-ft. work cars; Detroit United Rys., Detroit, Mich., 45 28-ft. closed motor cars; Toledo Railway & Light Co., 20 28-ft. closed motor cars. Several orders for passenger coaches for steam railroads will be shortly closed.

The Bagdad Railroad.

I have heretofore referred to the proposed railroad through Asia Minor and Mesopotamia to the Persian Gulf. It now seems that the final convention between the Sublime Porte and the German syndicate which obtained the concession (Nov. 17, 1899) is about to be concluded. According to generally accepted reports, the following are the principal conditions insisted upon by the Anatolian Railway Company:

Leaving Konieh, the line will pass by Hamidie, Bagdad, etc., to Bassorah, with six branch lines. The concession is for 99 years from date of firman, which will apply to the whole of the present lines of the Anatolian Railway, and 12 months is allowed for completion of plans and 12 years to complete the works.

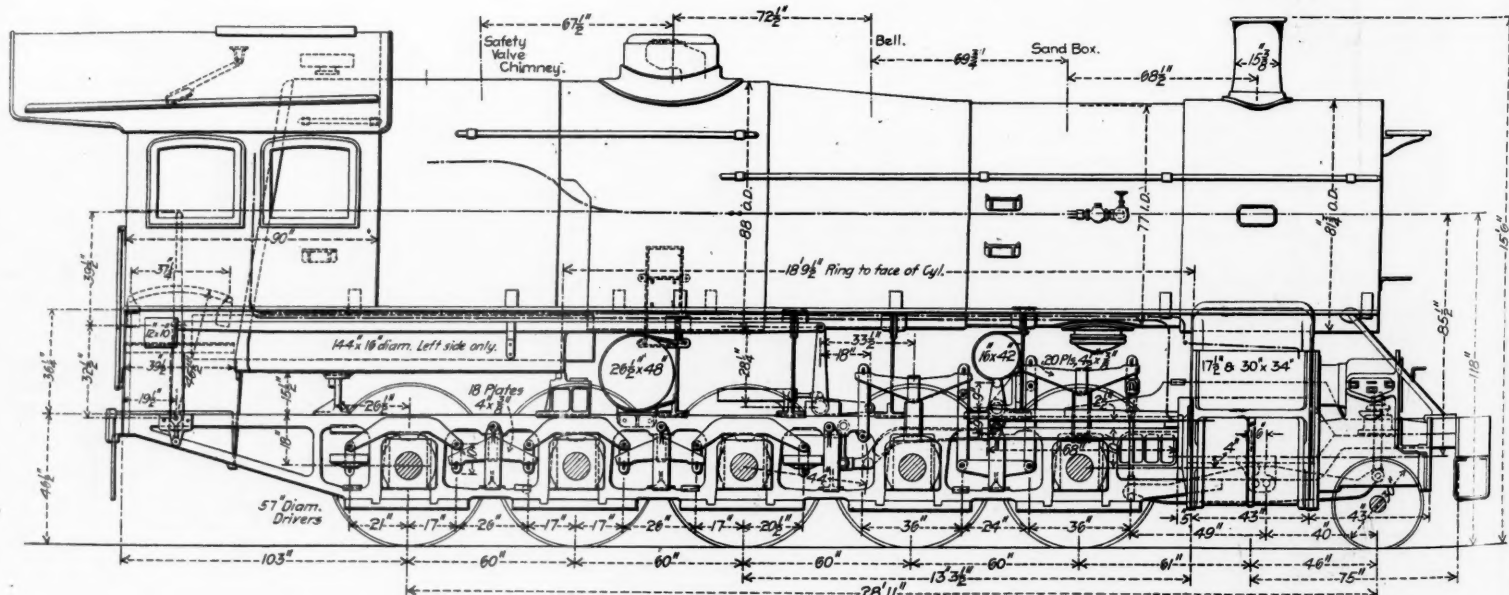
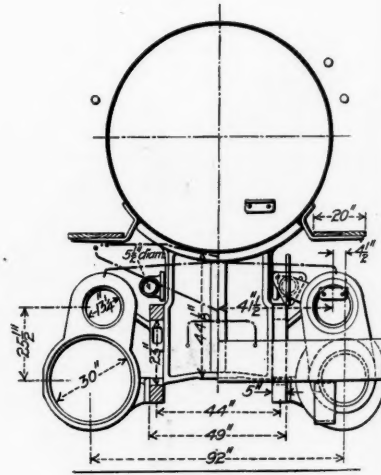
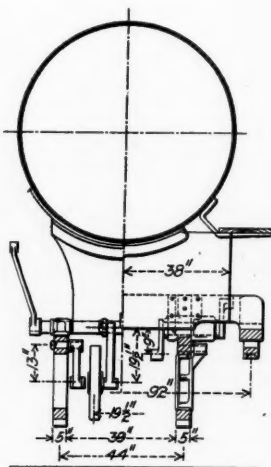
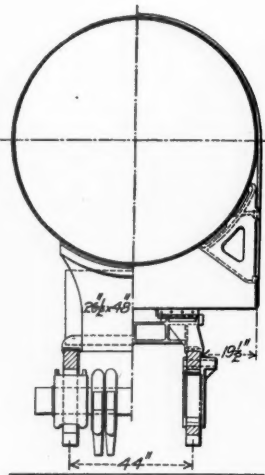
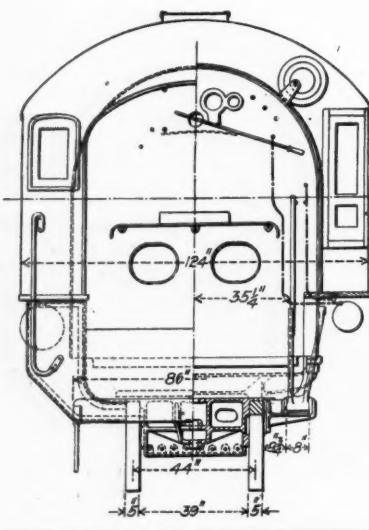
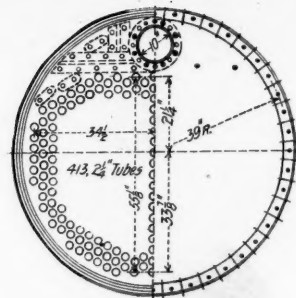
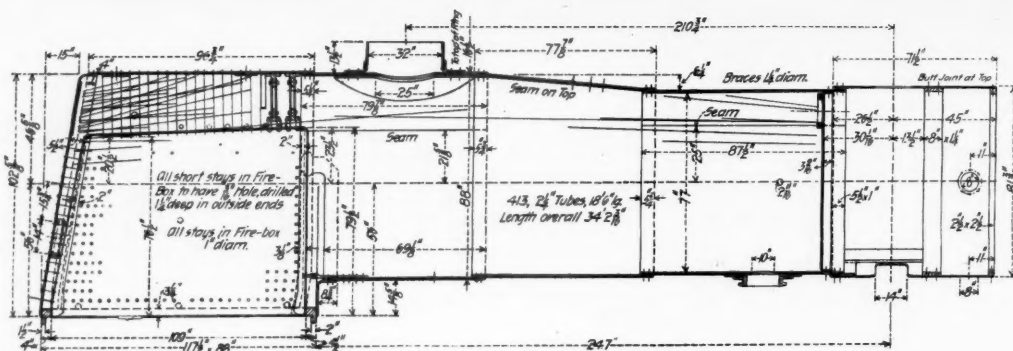
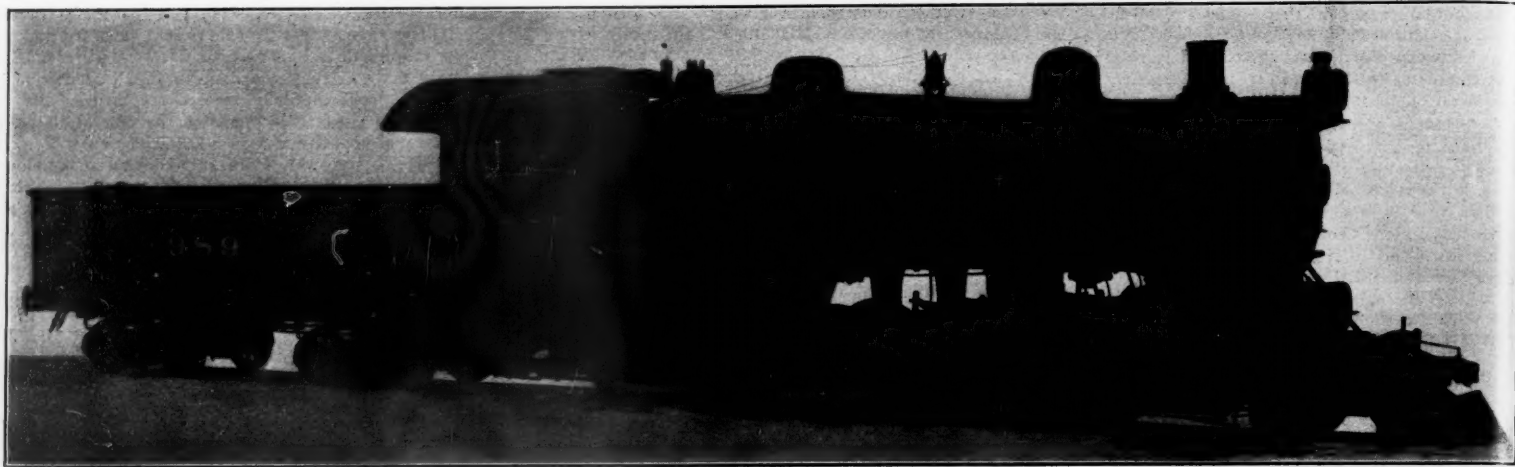
Other privileges are navigation service monopoly on the Chat el Arab, Tigris and Euphrates; construction of ports at Bassorah, Castabol, and Kazima; working of all mines not already conceded in a zone of 12.4 miles on each side of the line; exemption from customs duty on all material; exemption from all interior taxes, such as property tax and stamp tax; right to build brick and tile factories; installation of depots and magazines; monopoly for steamboat service between Stamboul and Haidar Pasha for the transport of passengers and merchandise.

As to the state kilometrical guaranty, the figures most frequently mentioned are 13,000 francs per kilometer (\$2,509 per 0.62137 mile) per annum, plus 4,500 francs (\$868) for "frais d'exploitation," which latter item looks somewhat like a permanent subvention, irrespective of receipts. The length of the line will be about 1,500 miles.

Considerable importance is attached to the inclusion of a clause allowing the railroad company to make advances to cultivators along the line, against mortgage on the property involved.

G. BIE RAYNDAL, Consul.

Beirut, Nov. 16, 1901.



Atchison, Topeka & Santa Fe Tandem Compound Decapod Locomotive—The Biggest and Most Powerful.

MR. G. R. HENDERSON, Superintendent of Motive Power.

Built by THE AMERICAN LOCOMOTIVE CO.

MR. JOHN PLAYER, Consulting Superintendent of Motive Power.

The A., T. & S. F. Tandem Compound Decapod—
Heaviest and Most Powerful.

In our issue of Dec. 20, 1901, we mentioned two four-cylinder tandem compound decapod freight locomotives that were being built at the Schenectady works of the American Locomotive Co., for the Atchison, Topeka & Santa Fe. The locomotives are now working in California, near Bakersfield, and the illustrations here given include a photograph of one of them, locomotive No. 989. While in the description the tractive force, 55,300 lbs., is given as a maximum obtained from indicator cards with the locomotive working compound, the proportions and weight make this the most powerful as well as the heaviest locomotive ever built. Up to this time the P., B. & L. E. locomotives have been the biggest, and we give in a table herewith some weights and dimensions of those and three other heavy locomotives for comparison with the Santa Fe decapod:

COMPARISON OF HEAVIEST LOCOMOTIVES.

	Atchison, Topeka & Santa Fe.	Pittsb'gh, Bessemer & Lake Erie.	Union Railroad.	Illinois Central.	Lehigh Valley.
Name of builder.....	American Loco. Co.	Pittsburgh	Pittsburgh	Brooks	Baldwin
Size of cylinders.....	17½ and 30 x 34 in.	24 x 32 in.	23 x 32 in.	23 x 30 in.	18 & 30 x 30 in.
Total weight.....	259,800 lbs.	250,300 lbs.	230,000 lbs.	232,200 lbs.	225,082 lbs.
Weight on drivers.....	232,000 lbs.	225,200 lbs.	208,000 lbs.	193,200 lbs.	202,232 lbs.
Driving wheels diameter, in.	57	54	54	57	55
Heating surface, sq. ft.....	4682	3805	3322	3500	4104
Grate area, sq. ft.....	59.4	36.8	33.5	37.5	90

The locomotive here illustrated is fitted up for oil-burning, but, as may be noted from the general description, it is intended that soft coal shall be used when desirable. We therefore give the grate area in the comparison with other big locomotives. The cylinder, saddle, and valve arrangements are practically identical with those of the Class Y-2 Northern Pacific locomotives as illustrated on an Inset and elsewhere in the *Railroad*

34 in., on 57-in. driving wheels, in a total height of 15 ft. 6 in. to the top of the stack above the rail and on a total wheel base of 28 ft. 11 in., with 259,800 lbs. total weight to be taken care of is a feat worthy of the times. Perhaps it would be in order to congratulate the Schenectady Works upon turning out the first locomotive to outweigh and outpull the P., B. & L. E. locomotives, even though the transfer of prestige from Pittsburgh to Schenectady be now a matter entirely within the family of the American Locomotive Co.

The general description follows:

General Dimensions.

Gage.....4 ft. 8½ in.
Fuel.....Oil and soft coal
Weight in working order (weight by scales).....259,800 lbs.
Weight on drivers.....232,000 lbs.
Wheel base, driving.....20 ft.
Wheel base, rigid.....29 ft.
Wheel base, total.....28 ft. 11 in.

Cylinders.

Diameter of cylinders.....17½ in. and 30 in.
Stroke of piston.....34 in.
Horizontal thickness of piston.....5½ in.
Diameter of piston rod.....H. P. ¾ in.; L. P. ½ in.
Kind of piston packing.....Plain rings
Kind of piston rod packing.....Jerome
Tractive force working compound.....55,300 lbs.

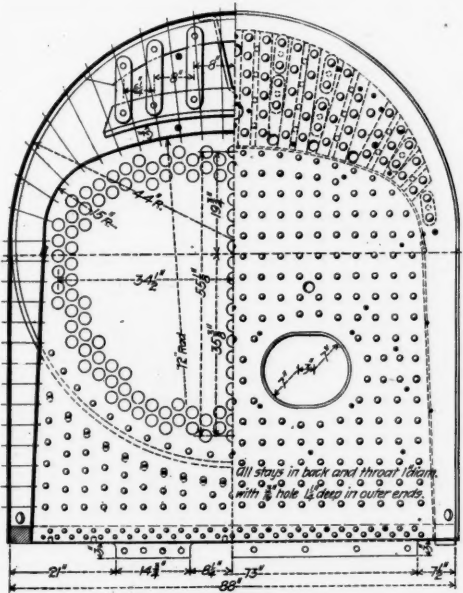
Valves.

Kind of slide valves.....Piston type
Greatest travel of slide valves.....6 in.
Steam lap of slide valves.....¾ in.
Exhaust clearance.....H. P. ½ in.; L. P. ¼ in.
Lead of valves in full gear, line and line F. & B.
¼ in. lead at ½ stroke cut-off

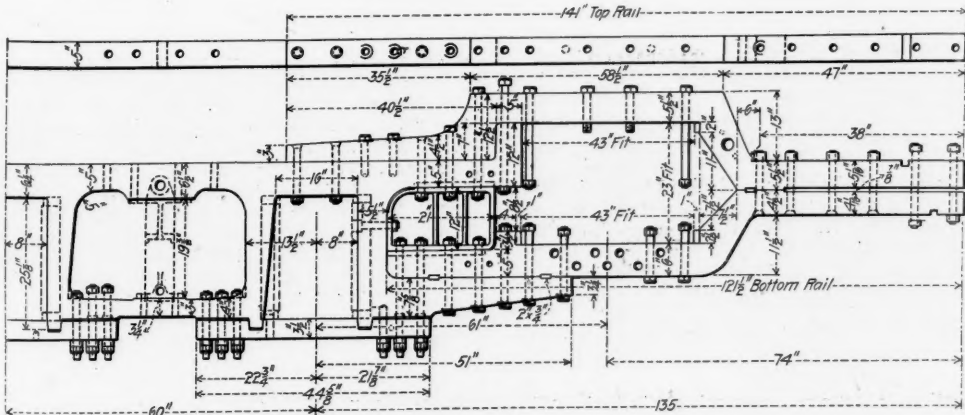
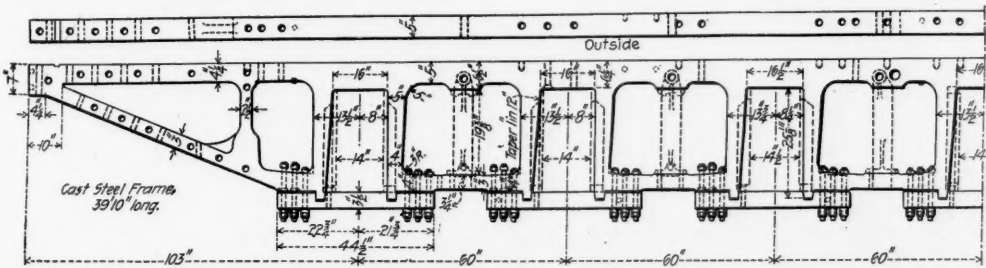
Kind of valve stem packing.....Jerome

Wheels, Etc.

Diameter of driving wheels outside of tire.....57 in.
Material of driving wheels centers.....Cast steel
Tire held by.....Shrinkage
Driving box material.....Main, cast steel; balance, steered cast iron
Diam. and length of driving journals.....Main, 10 in. x 12 in.; balance, 9 in. dia. x 12 in.
Diam. and length of main crank pin journals.....7 in. diam. x 8 in.; F. & B., 5 in. x 4¼ in.
Diam. and length of side rod crank pin journals.....Main side, 8¼ in. x 5½ in.; inter., 5½ in. dia. x 5 in.
Engine truck, kind.....2 wheel swing bolster



Sectional Elevation.



Cast Steel Frames.

Engine truck journals.....7 in. dia. x 12 in.
Diameter of engine truck wheels.....30 in.
Kind of engine truck wheels.....A. T. & S. F. patent, ¾ in. tire

Boiler.

Style.....Extended wagon top, with wide fire-box
Outside diameter of first ring.....78¾ in.
Working pressure.....225 lbs.
Material of barrel and outside of fire-box.....Coatesville steel
Thickness of plates in barrel and outside of fire-box.....13/16 in., 2/16 in., 1 in.
Horizontal seams.....Butt joint sextuple riveted, with welt strip inside and outside
Circumferential seams.....Double riveted
Fire-box, length.....108 1/16 in.
Fire-box, width.....79¼ in.
Fire-box, depth.....F., 79¼ in.; B., 76½ in.
Fire-box, material.....Sides, ¾ in.; back, ¾ in.; crown, 7/16 in.; tube sheet, 9/16 in.
Fire-box plates, thickness.....Sides, ¾ in.; back, ¾ in.; crown, 7/16 in.; tube sheet, 9/16 in.
Fire-box, water space.....In. to 6½ in.; back, 4 in. to 5½ in.
Fire-box, crown staying.....Radial 1½ in. diam.
Fire-box, stay bolts.....Ulster iron, 1 in. diam.
Tubes, material.....Charcoal iron, No. 11
Tubes, number of.....413
Tubes, diameter.....2¼ in.
Tubes, length over tube sheets.....18 ft. 6 in.
Fire-brick.....Arranged for oil burning
Heating surface, tubes.....4,476.5 sq. ft.
Heating surface, fire-box.....205.41 sq. ft.
Heating surface, total.....4,681.91 sq. ft.
Grate surface (when arranged for coal).....59.47 sq. ft.
Ash pan.....With air openings suitable for oil burning now
Exhaust pipes.....Single
Exhaust nozzles.....5½ in., 5¼ in., 6 in. diam.
Smoke stack, inside diameter.....15¼ in.
Smoke stack, top above rail.....15 ft. 6 in.
Boiler supplied by.....2 injectors, Nathan simplex, No. 11 R. & L., outside of cab

Tender.

Weight, empty.....60,000 lbs.
Wheels, number of.....8
Wheels, diameter of.....33 in.
Journals, diameter and length.....5½ in., dia. x 10 in.
Wheel base.....20 ft. 4 in.
Tender frame.....A. T. & S. F. S&D steel channels
Water capacity.....7,000 U. S. gallons
Total wheel base of engine and tender.....62 ft.

The special equipment includes Westinghouse-American combined brake on drivers, tender and for train. 11 in. L. H. air pump, Westinghouse engineers' air signal, Le Châtelier water brake on cylinders, sand blast, Leach triple, brake beams. Monarch, Westinghouse friction draft gear, Crosby steam gage 6½ in. face, three 3 in. Crosby open pop safety valves, one Nathan quadruple sight feed lubricator, and Boyer speed recorder.

The Interstate Commission Hearing on the Northwestern Combination.

Some extremely interesting testimony has been taken at Chicago before the Interstate Commerce Commission in the matter of the combination of the Northwest roads. Mr. Hill testified that the formation of the Northern Securities Company was brought about because the old men (some very old men) were anxious to get up a close corporation to which they could confide their interests with the assurance that the road would be managed along the old lines. He testified that the Northern Securities Company owns no stock in the Chicago, Burlington & Quincy Railway Company (the new company). The Great Northern and the Northern Pacific are the chief stockholders and elect the directors. The Northern Pacific and the Great Northern issued \$216,000,000 joint bonds to pay for the Burlington stock.

The Burlington was bought to get command of territory into which to send lumber from the Far Northwest; also to get control of coal territory for the service of the Northwestern roads.

Mr. Hill denied that he had tried to buy the St. Paul road. He denied that he had exercised any control over or given any instructions to the officers of the Northern Pacific regarding its operation. He said that he had issued no instructions to the officers of the Burlington, but when they asked him for advice they got it; sometimes he volunteered advice.

He asserted and re-asserted that competition does not reduce rates. The condition of the country makes the low rates which merely show how low a rate a railroad can give. "It is a principle that a road must give the lowest rate it can." He took the broadest view of the close and necessary relation between the railroad companies and the communities.

Under the rebate system in competitive warfare the general shipper pays the freight which the big shipper has dodged.

Mr. Darius Miller, First Vice-President and Traffic Manager of the Chicago, Burlington & Quincy, said that the Burlington was absolutely independent in its operations and in making rates. He said that he had received no instructions in regard to rates from Mr. Hill or Mr. Harriman.

Mr. Harriman testified that the Union Pacific holds between 35 and 40 per cent. of the Southern Pacific stock, or about \$75,000,000. He said that neither the Union Pacific, the Southern Pacific, nor the Oregon Short Line has any Northern Pacific stock; but the Oregon Short Line had held some of this.

The capital stock of the Oregon Short Line is between \$27,000,000 and \$28,000,000. It bought \$78,000,000 Northern Pacific stock last year, for which it paid \$17,000,000 cash and issued certificates of indebtedness for the rest. The Union Pacific furnished the cash and also took the certificates. Part of this cash was on hand, part was borrowed. This \$17,000,000 had not been paid back to the Union Pacific.

Mr. Harriman said that the Union Pacific interests thought that \$28,000,000 should be spent in improvements of the Southern Pacific, and this idea had prevailed in spite of opposition. The expenditure will be for new equipment and for revision of line and grade.

The Northern Pacific stock, which was bought by the Oregon Short Line, has been sold to individuals. He did not know to whom it was delivered. He said that no inducements have been offered to him to become a

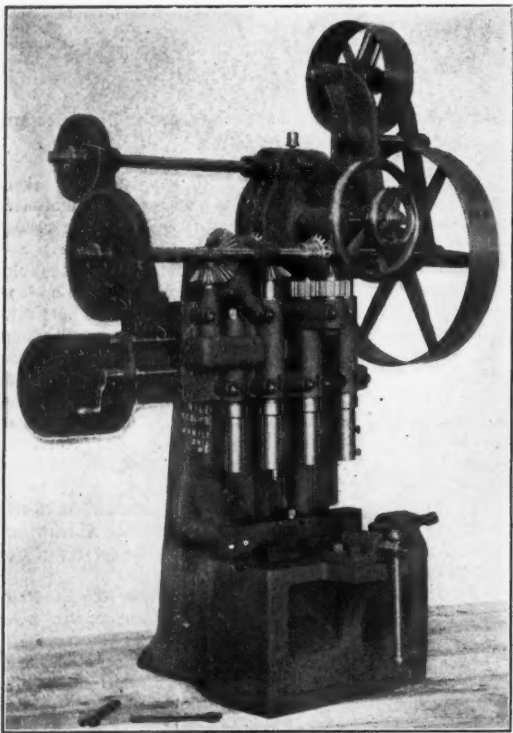
stockholder in the Northern Securities Company; but "we" received securities of the Northern Securities Company in part payment for Northern Pacific stock. The Oregon Short Line holds \$50,000,000 to \$60,000,000 of the Northern Securities stock.

Mr. Harriman expressed the belief that if he or Mr. Hill, or any other man, owned all of the railroads better rates could be given than by roads owned separately. That is, all of the business conditions could be taken advantage of. A shipment of some one commodity could be utilized to help out the movement of empty cars. In other words, there would be more elasticity in adapting means to conditions. It would be to the interest of the owner to induce the greatest movement and to increase the volume rather than to increase the rate.

A Niles Four-Spindle Rail Drilling Machine.

The Niles Tool Works Co., Hamilton, Ohio, is making a four-spindle rail drilling machine which we here illustrate. It is especially made for drilling holes for fish-plate bolts and bond-wires in rails.

The main spindles are adjustable by screws from 3½ in. to 9 in. between centers, and will drive 1¼-in. drills. The bond-wire spindle is contained in one of the main heads, is 6 in. from the main drill and usually drills ⅝-in. holes. The machine has power for driving all drills at once. All the spindles are mounted on one sliding head, which is counterweighted, has power down feeds with friction release and quick hand movements. The rail to be drilled is set end-wise against an adjustable stop and clamped in place by a vise, so that all holes will come alike. It is the practice to set up these machines in



A Four-Spindle Rail Drilling Machine.

pairs, one being right and the other left hand. One machine is set slightly in advance of the other and at a distance somewhat greater than the length of a rail, then the ends are drilled in succession by two men, sliding the rail from one machine to the other.

A Dynamite Explosion in New York City.

On Monday of this week, at a few minutes after 12 o'clock, noon, a great explosion of blasting gelatine took place on the work of the Rapid Transit Tunnel. The explosion was at Forty-first street and Fourth avenue, directly in front of the Murray Hill Hotel, and it caused more or less serious damage for two or three blocks either way from the center of the explosion. In the Murray Hill Hotel all of the windows on the north side and east side were blown out; generally the sash was carried out with the glass. Many ceilings fell all through the house, and there were other disturbances. One guest was killed by the mortar which fell from the ceiling as he was lying in bed. Damage of the same sort was done in the Grand Union Hotel, and in many private houses and other buildings in the neighborhood. At the Grand Central Station practically all of the windows on the Forty-second street front were wrecked and all of the clock dials were blown out; but little damage was done inside the building. So far as we learn no serious structural damage was done to any of the buildings.

Five lives are known to have been lost, and many people were injured.

The explosion was of the dynamite in a powder shanty on the surface of the street over the tunnel work. From the story of the man in charge of the powder shanty it seems that a blast jarred down a candle which fell among paper on the floor of the shanty. The man ran out and

got a pail of water and threw it on the paper, but the water was not sufficient to put out all that was burning; and then he fled.

The sub-contractor for this section of the work is Major Ira A. Shaler, M. Am. Soc. C. E. Mr. Shaler is an experienced contractor and engineer, and a graduate of Cornell University, and served as Major in the First Regiment of Volunteer Engineers in Porto Rico.

We have told briefly such facts as have been brought out up to the time of writing. It would be untimely to express any opinion as to the responsibility for this serious accident. Undoubtedly there will be great damages to pay, apart from the serious loss of life, but we judge that the newspaper estimate of \$1,000,000 property damage must be much exaggerated.

Massachusetts Railroad Commissioners' Report.

The Railroad Commissioners of Massachusetts, James F. Jackson, George W. Bishop, and Clinton White, have issued the thirty-third annual report of the Board; or, rather, that part of it which refers to standard railroads. The part which deals with electric roads is to appear later. The length of railroad in the State is substantially the same as last year, 2,108 miles. Three companies, the Boston & Albany, the Boston & Maine, and the New York, New Haven & Hartford, now operate over 96 per cent. of the railroad mileage of the State, and their business constitutes 98 per cent. of all that shown in the Commissioners' report.

The statistics of mileage, capital, traffic and earnings appear in the report in the usual places, but they are this year given in the shape of a separate report, signed by the accountant of the board, Mr. F. E. Jones. The chapter on accidents appears as usual, but, as appears from reports in former years, this part is made up by the secretary, Mr. Crafts. Following the chapter on accidents is the report on bridges signed by Mr. Swain. This leaves only six pages of material which comes from the hands of the Commissioners themselves. The principal subjects here discussed are the need, in the near future, of a reduction of passenger fares; competition with street railroads; the physical condition of the railroads and their equipment; and grade crossings.

In the matter of passenger fares the Commissioners say that the railroads have adopted their recommendation of a year ago to sell 500-mile books at 2 cents a mile; and "under continued conditions of prosperity 2 cents a mile for all long distance travel is to be expected at an early day." Reference is made to two recent cases in which the board discussed demands for reductions in suburban fares for single rides, in only one of which a reduction was ordered. These decisions have recently been reported in the *Railroad Gazette*. In passing we may say to the reader that these and other reports recently issued by the Massachusetts Commissioners are model documents of their kind.

On the subject of competition with street railroads the report says:

"Within a few weeks frequent trains and lower fares have been introduced upon the Milford branch of the Boston & Albany Railroad, apparently with successful results. A year ago the single-track branch of the New York, New Haven & Hartford Railroad, connecting Fall River and Providence, was equipped with an overhead trolley system for use in the passenger service, the number of trains increased from 16 to 60, and the fare reduced from 50 cents to 20 cents. There is little reason to doubt that this enterprise has proved profitable, and the public has certainly realized benefits in the multiplication of trains and cheaper cost of travel. It may be remarked, in passing, that it was unfortunate that, in manifesting this progressive spirit, the management should have provided such poor car equipment and inadequate accommodation in connection with through travel, and should have permitted the conduct of this electric service in disregard of published time tables. The convenient terminal facilities and four-track system of the New York, New Haven & Hartford and of the Boston & Albany Railroads [at Boston] invite a further development of the competition with the street railway, in affording such seemingly favorable conditions for electric circuit service through a populous suburban district."

In reporting on the inspection of railroads the Board makes a retrospect for five years, during which time there has been marked improvement in road, equipment and facilities. One hundred and thirty-three new bridges have been built and 259 strengthened, and 140 grade crossings have been abolished. Many interlocking and signal plants have been put in, but there is need of more equipment of this kind, "which should be provided at an early date." There are many new improvements in engines and passenger cars, but there are "still in use too many passenger cars upon which no favorable comment can be made." In the five years the New Haven road has built 18 new stations, the Boston & Maine 19, and the Boston & Albany 8. In cost and attractiveness of stations the Boston & Albany "excels not only in Massachusetts, but in the country."

The grade crossing fund has been exhausted; that is to say, in the past 10 years the State has spent about five million dollars for the elimination of grade crossings, under the general law, besides large sums under special acts. The Commissioners recommend, as did the governor in his inaugural address, that the past policy of the State be continued; that a new appropriation be made. "There can be no question that the permanent benefits received

by the railroad, the street railroad, the traveling public, and the taxpayers from the abolition of crossings are worth all that they cost." With the growth of the street railroad system these companies are interested in the grade crossing question as their lines when on private property are traversed by cars at high speed. The same restrictions which apply to a steam railroad crossing a highway should now be applied, in many cases, to the electric road.

The board has to approve issues of stocks and bonds; and in so doing has to make an estimate of the value of the railroad interested. Heretofore this valuation has been made by an expert employed by the railroad company; but the Commissioners call attention to the fact that they should have power to employ an expert of their own.

The statistics of accidents show a remarkable falling off from the preceding year. The total number of persons killed during the year ending June 30 was 179; injured, 432; total, 611. The total for 1900 was 927; for 1899 it was 1,072. In the year now reported there were no passengers killed by train accidents; the total number of passengers killed was 4; injured, 33. The number of employees killed in coupling accidents was five, which is one less than in the year preceding; injured, 93, as compared with 165 in the year preceding. The number of persons killed at grade crossings during the year was 22; injured, 15. There are 2,001 grade crossings in the State. The more dangerous crossings, to the number of 202, have been abolished during the last 11 years. The ratio of accidents, at crossings protected by gates, flagmen, or bells, was one in 54; and the ratio at crossings unprotected was precisely the same.

The report of the bridge engineer shows 21 new bridges built during the year, all being of metal. Of the 29 wooden bridges classed as "rebuilt," 14 were replaced by metal bridges.

The Fourth Avenue Tunnel Disaster.

The inquest before Coroner Scholer, which was partly reported in our last issue, was concluded on Jan. 24. The principal witness on that day was President Newman, of the New York Central. The essential parts of his testimony are given in our editorial columns, where also will be found the verdict of the Coroner's jury. The engineman of the New York Central train, Wisker, was not called to the witness stand.

The Railroad Commissioners began their investigation of the collision on Jan. 23. At this investigation Mr. C. L. Addison, of the Long Island road, testified that the signals in the tunnel were as good as any he knew of. He did not believe in audible signals, but "thought that a system of continuous lights from the distant to the home signal might be a good thing."

Mr. John T. Cade, who had been engaged by the District Attorney to examine the signals in the tunnel, told the Commissioners, in answer to questions, that he had seen tunnels where the atmosphere was worse, but never one where the traffic demands were greater. Reviewing his experience of twenty-four years in this and other countries, Mr. Cade said that the Fourth Avenue Tunnel was as perfectly equipped as any he knew of, and much better than some.

Q.—How is it better? A.—It has duplicate signals.

Q.—Can you suggest any change, regardless of expense, which will make the tunnel safer? A.—I think any change in the present system would be dangerous. A multiplication of safety devices leads to confusion and danger.

Q.—Can you think of anything we can put in the tunnel that will improve matters? A.—I cannot. But I would like to say that if I had my way I'd take some things out. I'd take out the torpedoes and gongs, and I'd make the engineers see the danger signals. A man has no right to go ahead with his train under any circumstances unless he sees a clear signal ahead.

Q.—How about having men at home signals to set off torpedoes instead of depending on a mechanical device? A.—In England that method is employed. It is unreliable.

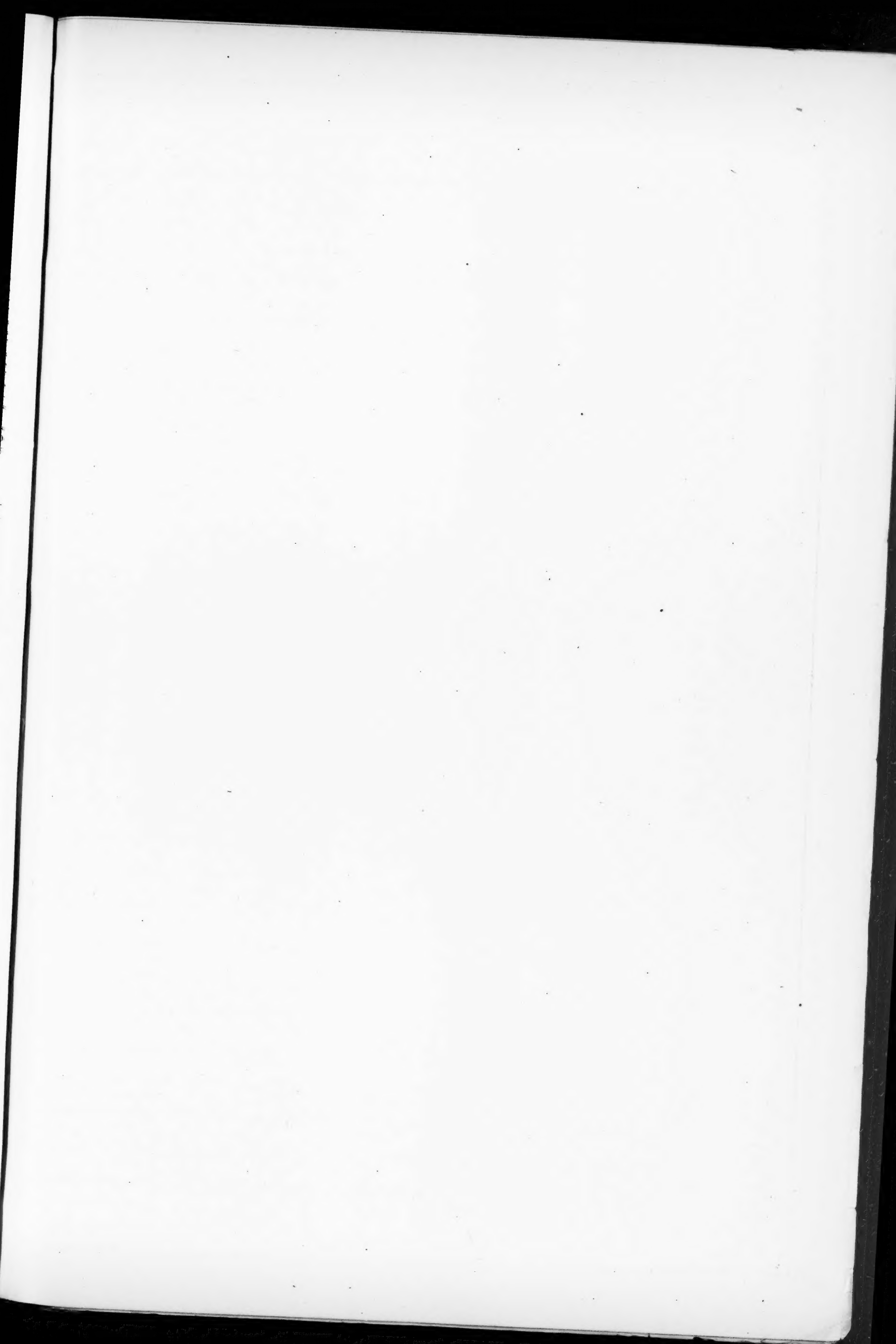
General Superintendent Platt, of the New Haven road, asked if he had any suggestions to make, said:

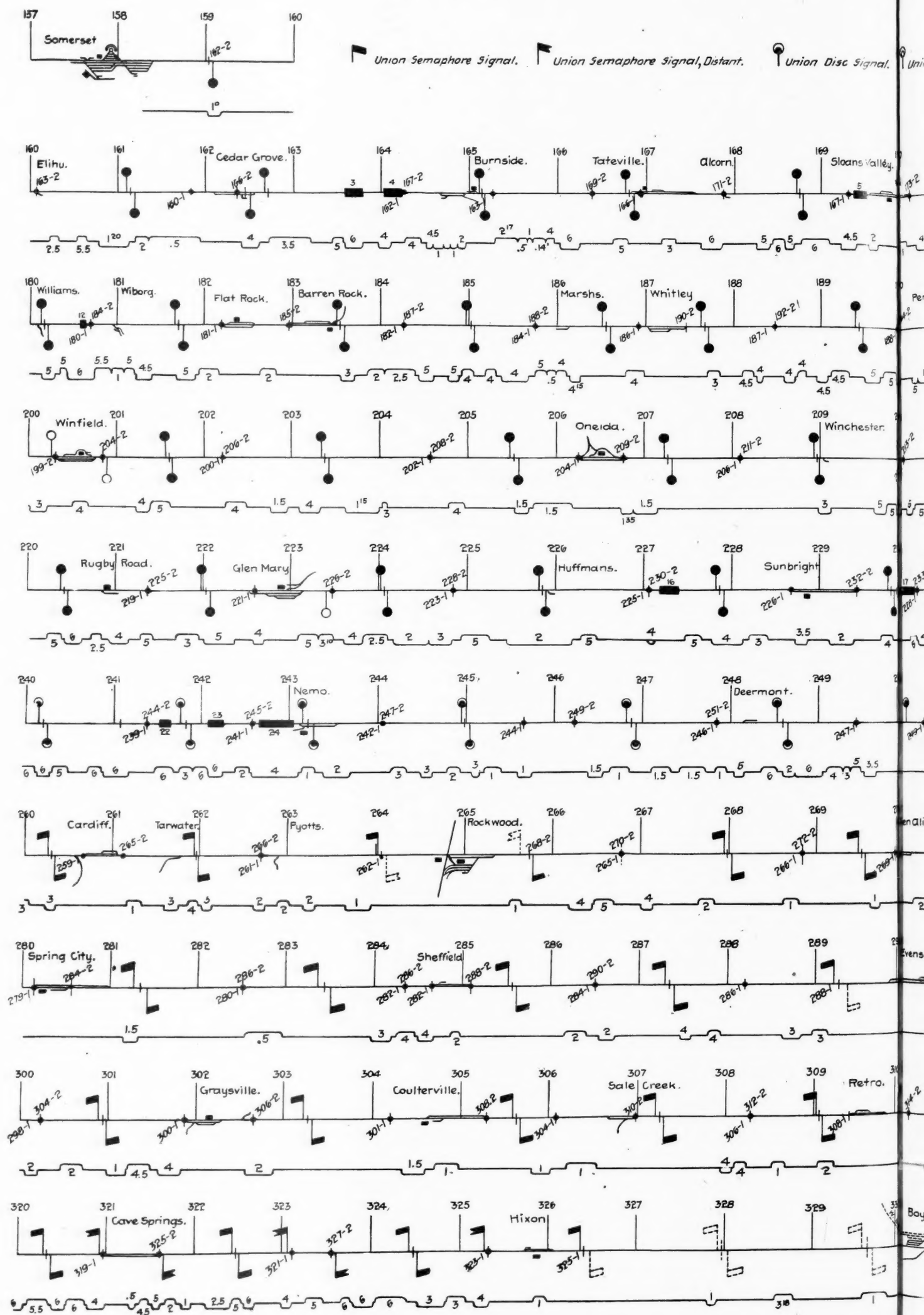
One hundred and twenty millions of people have been carried through that tunnel and there has never been an accident save by the failure of the human equation, which cannot be eliminated from the transportation problem. There is no track in this or any other country so safely signaled as the Park (Fourth) Avenue Tunnel. All these signal systems, such as a light in the cab, a whistle in the cab, the automatic setting of the brakes, are of no use because they go on the theory that unless a danger signal is out everything is safe, which is fundamentally wrong, as Mr. Cade has explained. The higher the development of these devices the worse they are, because they start wrong.

On Jan. 25 the railroad company issued an order limiting the speed of all trains through the tunnel. Between Fifty-fifth street, the south end of the tunnel, and Ninety-sixth street, the north end, all trains must take at least six minutes, which is equal to about twenty miles an hour.

On Jan. 27 the State Railroad Commissioners issued the order given below. The Board also prepared a bill introduced in the Legislature, empowering it to prohibit the future use of steam locomotives in the tunnel. The order of the Board is as follows:

The Board of Railroad Commissioners hereby recommends and directs, as immediate and preliminary means for the lessening of dangerous conditions and the secur-

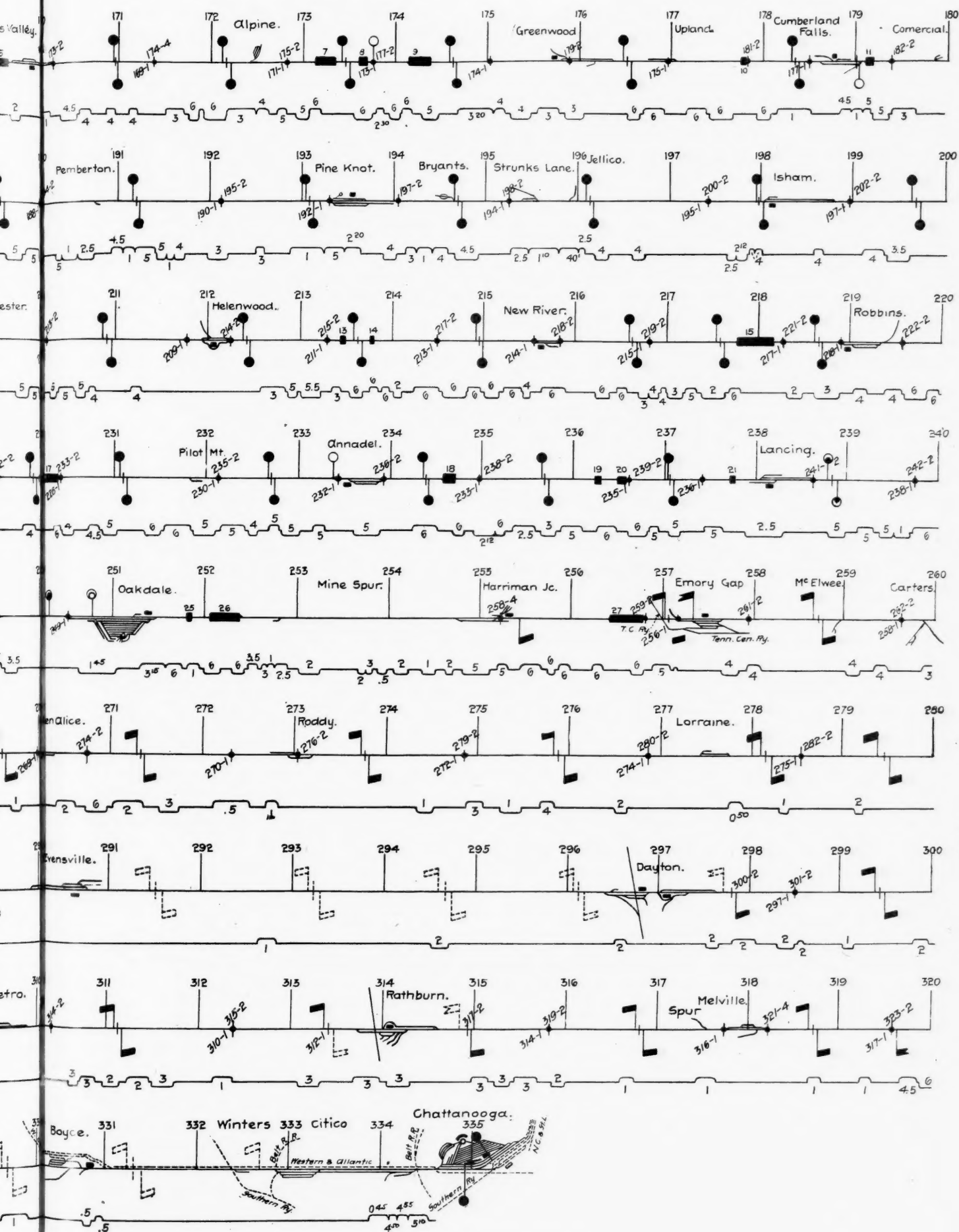




AUTOMATIC BLOCK SIGNALS ON THE CHATTANOOGA DIVISION OF THE CINCINNATI, NEW ORLEANS & GULF COAST RAILROAD.

NOTE.—The location of signals which are yet to be erected is shown by a dashed line.

Signal. Union Disc Signal, Distant. Union Clock-work Signal. Union Clock-work Signal, Distant. Overlaps. Tunnels.



ATI, NEW ORLEANS & TEXAS PACIFIC RAILWAY COMPANY, SOMERSET TO CHATTANOOGA.

are yet erected is indicated by dotted-line symbols.

ing of safe operation in the New York and Harlem Railroad tunnel in New York City the following:

First—That no train be allowed to run at a greater speed than eighteen miles an hour in the Fourth avenue tunnel, under existing conditions of terminal facilities.

Second—That no cars carrying passengers, in which oil is used for illuminating purposes, be hauled through said tunnel.

Third—That no engineer be detailed or permitted to run a locomotive engine through or in said tunnel, in sole control of said engine, until after he has made at least twenty-five trips over each track through said tunnel, being one hundred trips in all, under the pilotage and instruction of an engineer who has had experience of at least two years in running engines through said tunnel; that a record be made and kept on file in the office of the manager of the Harlem line, so called, of each day of such probationary running, giving the date and time of such runs, the tracks over which such runs are made, and the name and term of service of the probationary engineer and of the instructing engineer or pilot.

Fourth—That no soft or bituminous coal be used for the stoking of locomotive furnaces while running through said tunnel, nor shall any locomotive be moved into or through said tunnel unless the fire then in its furnace shall be in a coked and incandescent state or condition, and has ceased to discharge black smoke; in the event that the fire need restoking while in or passing through the tunnel, such restoking shall be made with charcoal, coke or anthracite coal.

These four recommendations and directions to take effect within twenty-four hours after the service thereof upon an officer of each of said companies.

Fifth—That in the signal lamps used in said tunnel, the lenses be ground instead of pressed, the present lenses to be replaced as soon as practicable; also that the green glass in the signal lamps in said tunnel be replaced with a proper lighter shade of green as soon as practicable; also, that all of these signal lamps be supplied, as soon as practicable, with circular wicks instead of flat wicks.

That the companies shall notify this Board within three days after the service hereof upon an officer of each of said companies when those recommendations and directions will be complied with.

Section 1—The Board of Railroad Commissioners of this State is hereby empowered, in its discretion, to direct that in what is commonly known as the Fourth avenue tunnel, New York City, extending from Ninety-sixth street south, and the open cut and yard extending to and into the Grand Central Station now operated by the New York Central and Hudson River Railroad Company and the New York, New Haven and Hartford Railroad Company, no steam locomotive shall be operated after a date to be fixed by said Board. Said Board may permit, for a limited period, the operation of steam locomotives in said tunnel, after the date so fixed, if it shall appear to it that such operation is temporarily necessary, pending the completion of the work and arrangements required for operation of trains by other motive power. Pending the discontinuance of operations of steam locomotives in said tunnel, said Board may direct in detail the manner in which all steam locomotives and trains shall be operated in said tunnel, including all matters which are or may be involved in their operation.

Section 2—All acts or parts of acts inconsistent with this act are hereby repealed.

Section 3—This act shall take effect immediately.

New York Railroad Commissioners' Report.

The State Railroad Commissioners of New York, A. W. Cole, F. M. Baker, and G. W. Dunn, have issued the Nineteenth Annual Report of the Board. The report opens with a brief chapter on the general railroad situation. Of the 92 millions increase in gross earnings in the United States, for the last fiscal year nearly one-third was on railroads reporting to this Board. The Commissioners receive few complaints as to freight or passenger rates. The Board favors the project, which has been started by the Produce Exchange of New York City, to make the Commissioners' decisions on freight and passenger rates binding on the railroad company until modified or set aside by a court.

The length of railroad in the State, June 30 last, was 8,144 miles, an increase of 44 miles over the preceding year. Five passengers were killed in train accidents during the year and 11 in other accidents. The totals in the accident record are as follows (not including elevated roads): Sixteen passengers, 250 employees and 529 other persons killed; 375 passengers, 766 employees, and 400 other persons injured. The number of employees killed in coupling or uncoupling cars was 11, the same as in the preceding year; but the number injured, 44, was 138 less than the total of 1900. The Commissioners have had their inspector investigate every accident of importance during the past year, but they have come to the conclusion that this takes too much time and that the inspector had better be devoting himself to something else; but he will still investigate accidents which seem to demand special attention. The Board does not give out information about accidents; they are made public only through the annual reports.

The general business of the Board during the year is represented by 303 hearings, applications, complaints, etc., and 115 accident investigations. This last includes both steam and street railroads. The Board held during the year 261 public hearings.

The report gives a long statement of the questions pending before the Board concerning changes in grade crossings, and also a list of the cases where changes have been made in the past two years. Under the special

law, passed about five years ago, 67 grade crossings have been abolished and on 12 more the work is nearly finished. In 22 other cases work is expected soon to begin. In 16 cases the Commissioners want a bridge, but the local authorities will not acquire the necessary land. A number of crossings, illegally established, have been closed. The Board allows new crossings only after most full and careful consideration.

In the four years that this law has been in effect the State has appropriated for changing grades, \$367,500, or at the rate of \$100,000 a year, less the expenses of the Board in this behalf. The report gives brief accounts of the grade crossing laws in Massachusetts, Connecticut, Ohio and Maine.

The aggregate length of the street surface railroads in the State is 1,619 miles, an increase of 118 miles over the preceding year. The number of tons of freight carried on these railroads during the year was 478,311, nearly twice as much as during the preceding year. Other statistics of street surface roads appear in the following table (cents omitted):

	For year ending June 30, 1901.	For year ending June 30, 1900.
Capital stock	\$193,558,439	\$182,310,412
Funded debt	196,344,650	193,247,738
Unfunded debt	53,749,456	49,029,361
Cost of road and equipment	386,695,251	370,015,259
Gross earnings from operation	43,068,405	40,811,563
Operating expenses	24,501,456	23,989,180
Net earnings from operation	18,566,949	16,822,382
Income from other sources	1,767,354	1,364,200
Gross income from all sources	20,334,303	18,186,583
Taxes	2,346,996	2,311,303
Miscellaneous	76,686	45,355
Interest paid and accrued	9,388,593	7,694,553
Dividends	7,433,463	6,889,565
Surplus for the year	1,007,783	568,616

The items of interest and dividends include interest and dividends paid by lessors from rentals received from lessees as follows:

	1900.	1901.
Interest	\$3,335,653	\$3,589,445
Dividends	2,878,957	3,159,646

The percentage of dividends to capital stock of street surface railroad companies, for the year ending June 30, 1901, was 3.84; in 1900, it was 3.77.

Street railroad companies do not bear any part of the expense of eliminating grade crossings. If the Legislature should decide that these companies ought to pay a part, it is recommended that the commission be empowered to determine what the share shall be.

Twenty-eight passengers, 24 employees and 108 other persons were killed on the street surface railroads of the State during the year to June 30, and 425 passengers, 78 employees and 364 other persons were injured.

The expert of the board has inspected the street railroads of the State during the year, and his work has resulted in the installation of derailing devices at points where street roads and steam railroads cross at grade; also in many other improvements. Speaking generally of electric railroads the inspector of the board reports as follows:

"Nearly all of the suburban roads of this State are single track. The gradual change which has been made in cars and equipment on this class of roads, and the higher speeds at which they are now operated, have largely increased the number of accidents. While this is especially true of the suburban roads, the accidents are not confined to this class of roads, a large number occurring on city roads.

"The physical conditions of the roads have been much improved in the past year. This has been done by replacing old rails with new, adding new ties, surfacing and ballasting track, replacing wooden structures with iron bridges, the placing of derail switches and guard-rails, the addition of improved brakes, sand boxes and oil tail-lights. Many of the companies are now providing their employees with printed books of rules, and printed time-tables showing the leaving time at the termini and the time at meeting points. Several electric railroads are now equipped with block signal systems, and on three of them cars are now operated under a train despatching system, as complete as is in use on most of the steam roads.

"A large portion of all of the city roads is now constructed of 9-in. girder rail and 56 to 80-lb. T-rail, which has replaced the 4 and 6-in. girder and the 35 and 40-lb. T-rail formerly used. This improvement in construction is also true in cases of suburban roads.

"Notwithstanding what has been said in reference to the improvement of track, roadbed, cars, equipment and method of operation of the electric roads of the State, the large number of accidents occurring on them show that these improvements should be continued."

The Board repeats its recommendations of former years concerning features of electric railroad service in which improvement is desirable.

The Burning Up of Electric Cars.

Week before last we printed a letter from Mr. George Westinghouse, which called attention to certain dangers now existing in electric traction. The same letter was printed in the *New York Times*. Its publication was followed by quite a storm of letters and editorial articles pointing out the ignorance of Mr. Westinghouse and his Bourbonism in thus obstructing progress. But he was exactly right in spite of the able editors, the amateur critics and the electric promoters, as will gradually be made clear. Meantime we print below part of a further letter from Mr. Westinghouse to the *Times* on the same subject:

"No one can have a stronger belief than I entertain

of the advantages to be derived from the use of electricity in the operation of trains. A lifelong experience, however, in connection with safety appliances upon railroads has caused me to view the subject from quite a different standpoint from that usually taken, especially by inventors and promoters, and in some cases by manufacturers of electrical apparatus, who evidently dislike to emphasize the dangers attending the application of so much electrical machinery beneath the ordinary combustible cars now generally in use and the utilization of which has been contemplated in order to keep down the total cost of installation.

"I believe a further useful purpose will be served by particularizing some of the dangers to be guarded against in the fitting of trains with electrical apparatus:

"1. A great advantage of electric traction is the possibility of a much higher speed. This, however, while not extending the vision of the engineer in charge of the apparatus, will require a greater distance within which to stop the train.

"2. When many tons of electrical apparatus are distributed beneath several cars of a train, and of necessity more or less loosely supported, and between which and the rails and roadbed there is but a small clearance, it is evident that much greater precautions will have to be taken than is ordinarily the case with the running gear of the present steam cars, derangements in which have often been the cause of accident.

"3. Electrical apparatus supported beneath the car can develop by means of a short circuit heat energy sufficient to instantly ignite cars of wood construction, and this has occurred repeatedly, notwithstanding the presence of safety appliances, intended to guard against such occurrences.

"4. When a total wreck results from an accident, and experience has shown that accidents are inevitable whatever the mode of propulsion, the debris scattered over the 'live' and other rails would render useless the ordinary circuit controlling devices which may be located upon the cars. This emphasizes the importance of a non-combustible construction of cars."

The Power Brake for Street Cars.

The following communication regarding power brakes on street cars is from Mr. E. A. Hermann, Sewer Commissioner of St. Louis, who was for 15 years assistant civil engineer on the Pennsylvania and Big Four railroads. It was written for the *St. Louis Globe-Democrat*:

"The necessity of power brakes on electric street cars is becoming more apparent every day. The long list of casualties can leave no room for doubt that mechanical power is required to quickly stop these cars as well as to put them in motion.

"Electric street cars are a development of the former horse cars, but the conditions of their operation are much more nearly like those of the steam railroad cars than of the old horse cars; the same precautions and provisions made for the safe operation of steam railroad cars should, therefore, be made for the safe operation of electric cars.

"The difference between the action of hand brakes and power brakes is this: In the hand brake the power is applied by slowly increasing from a minimum to a maximum; in the power brake the power is applied instantly and held at its maximum. The total amount of power required to stop a car moving at any given rate of speed is the same, no matter whether that power is applied by a slow increase to a total or by a quick application of the total, but if the total amount of power is expended in a short time the car will stop in a short time and consequently in a short distance.

"A motorman winding his hand brake with the utmost energy can not escape losing fractions of most precious seconds, on which life or death depend, before he is able to make the application of power appreciable in retarding the speed of the car, although when the car finally does stop he will have expended just the same amount of power as the power brake which would have applied its maximum power instantly, and expended the same total amount of power in one-tenth the time and distance, and thereby stopping the car in one-tenth the time and distance possible with the hand brake.

"Power brakes are in use on the electric cars running in East St. Louis and Belleville, Minneapolis and St. Paul, the lines radiating from Toledo, Cleveland, Hartford and many other cities.

"Some interesting experiments were made last week with the compressed air brake on the electric car owned by this city and operated on the city's railroad between the waterworks pumping stations at Baden and the Chain of Rocks. The car was stopped within the following distances when running at a speed of:

"Twenty-five miles per hour, stopped in 120 ft. (twice the width of the average street).

"Twenty miles per hour, stopped in 100 ft. (the width of Lindell boulevard).

"Fifteen miles per hour, stopped in 60 ft. (the width of the average street).

"Ten miles per hour, stopped in 25 ft.

"Eight miles per hour, stopped in 15 ft. (the width of the average alley).

"The speed fixed by ordinance for the electric cars of this city varies greatly with the different lines. Taken as a whole it may be said that the ordinance speed shall not exceed eight miles per hour in the area between Grand avenue and the river, Chippewa and Salisbury streets, and not to exceed 15 miles per hour outside of this district and within the city limits."



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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

Last week, in giving figures showing the output for 1901 of the various locomotive building works in the United States, we were unable, because of lack of official figures, to say how many were compound. We now learn that of the 3,384 locomotives built during the year, 825, or a little more than 24 per cent., were compounds. This is 280, or about 66 per cent. more than in 1900, when 545 out of a total output of 3,153 locomotives, 17 per cent. were compounds. In 1899 the output of this type of locomotive was 339, or about 14 per cent., and in 1898, 373, or 20 per cent. of the total output.

The Canal and the Railroads.

Isthmian canal matters have been quiet the last week. The Supplementary Report of the Commission seems to be a hard nut for Senator Morgan, Mr. Hepburn and other uncompromising Nicaraguans. Now, while we are breathing, it is not without interest to think a moment of the attitude of the railroads towards an Isthmian canal. One of the favorite propositions of the editor and the agitator who know nothing about the matter except what other editors and agitators say, is that this whole matter has been blocked for years by the "railroads," and that the present movement towards Panama has been deliberately inaugurated and promoted by the railroads to kill the whole project.

For years we contended that the worst enemies of the canal were the men who were trying to force us to take up the project of the Maritime Canal Company, and commit the United States Government to Nicaragua on the lines and dimensions laid down by Menocal and his associates. They fought sturdily for a long time against any government investigation, and insisted that any man who wanted to delay matters until the truth was known and facts were ascertained was a wicked person, in the pay either of the British Government or of the railroads. We took the ground that the quickest way to settle this matter was to send a competent, impartial commission to the ground and to the existing records, with ample time and money to make an adequate study. Finally this has been done, and now we have the result in much the wisest report that has ever been made on this long-studied subject.

But to go back to the railroads, we have long held that the railroads as railroads are not opposed to the Isthmian canal. Such work as has been done at Washington in opposition to the canal has been by individuals who wanted to save the country from a mistake. We doubt if any railroad company has paid a cent out of its treasury for an anti-canal lobby. On the other hand, many railroad men have been much in favor of an Isthmian canal. It must be obvious to any man who can see beyond the editor's desk that if any interest in the country can profit by a canal it is the railroads. All of the railroads giving communication between the interior and the

seaboard on the Atlantic and on the Pacific will profit by this canal if anybody profits by it; and even the transcontinental roads will gain by it more than they will lose if it does one-half of what its advocates expect it to do. That is, trade will be developed along the Pacific Coast which the transcontinental roads will carry to and from interior points; and the great development, so far as they are concerned, will be in the higher class and more profitable freight. But further, if the editors and agitators who believe in the railroad bogie will think of this matter with a globe before them they will get a little additional light. If they know enough to know what great circle sailing means, and what a great circle is, they will discover that San Francisco lies practically on the great circle passing from the Pacific end of either canal to Yokohama and Hong Kong. It follows then that ships trading to Asiatic ports would call at San Francisco to coal and to take on mails, passengers, and light and high-class freight in the movement of which time is important; and all of this business would have been carried across the Continent by the railroads.

The Verdict on the Tunnel Accident.

The District Attorney has secured his verdict against the New York Central in the tunnel matter. If he had any standing before the Coroner it was as a helper in learning and making public the facts. But he took the part of a prosecutor and used the common devices of criminal practice to get a conviction. He withheld evidence; he distorted evidence; he diverted attention from the real point, and he interjected stump speeches to prejudice the jury against the company. We are deeply sorry for this revelation of Mr. Jerome. It is a misfortune to the city of New York that he should so suddenly reveal himself as, in character, a man of the third grade instead of the first grade. No doubt, he will yet be a useful officer, but he is not likely to recover the place in the opinion of wise and high-minded men which he has lost. Early in the proceedings he took the high ground that lawyers representing persons interested were not to be permitted to interrupt the dignity of the proceedings or to befuddle the jury, but he promptly turned his abilities to securing a popular verdict; or to establishing a preconceived opinion, or to doing both.

The verdict of the coroner's jury says:

"We further find that the said engineer, John M. Wisker, owing to the heavy atmosphere, due to weather conditions, together with the presence of large bodies of steam and smoke escaping from trains passing on various tracks in said tunnel, obscuring said signal, was unable to locate said danger signal."

"We further find faulty management on the part of the officials of the New York Central & Hudson River Railroad, and we hold said officials responsible for the reason that during the past ten years said officials have been repeatedly warned by their locomotive engineers and other employees of the dangerous condition existing in said tunnel, imperiling the lives of thousands of passengers, and they have failed to remedy said conditions; and also for the reason that certain improvements in the way of both visible and audible signals could have been installed, and this disaster thereby have been avoided, and for the further reason that no regulation of speed at which trains should run in said tunnel has been enforced, thereby allowing engineers to exercise their own discretion."

We find nothing in all the testimony that justifies this expression of the opinion that better signals could have been used. We do find it reported, however, that one of the lawyers of the railroad said that unanimous testimony had been brought out to show that the present system is the best in the world.

"The District Attorney," said he, "has received a report from an expert on signals of his own selection, Mr. Cade. He pronounced our system the best that can be devised. Now, I understand this expert is not to be called. I think, under the circumstances, it is only fair to ask Your Honor to instruct the District Attorney to change his line of examination."

This report was not put in evidence. On the contrary, there was an obvious purpose to belittle the evidence of the signal experts and to becloud the minds of the jurors as to the competence of the officers. Here are some extracts from Mr. Jerome's examination of Mr. Newman, the President of the road:

Q. What powers and responsibility has Mr. Franklin got over this Harlem line from Fifty-second street to the "Y"? A. He has full charge of the trains and operation of the signals, full charge of everything except construction and maintenance.

Q. Now, when you became the official superior of Mr. Franklin, did you or did you not make any inquiries into his fitness for the position? A. I made a general inquiry as to the fitness of all the staff.

Q. In regard to Mr. Franklin specifically? A. Mr. Franklin among them.

Q. Did you consider that the training of a conductor on a railroad was the kind of training to fit a man for handling travel over a road like the Harlem line from the "Y" to Fifty-second street? A. That certainly is a very good training for a man for that position.

Q. And you think that the training of a conductor would

especially fit a man for the determination of whether a given system of signals in a place like the tunnel was the safest? A. As to the signals, I presume they were selected by men who were experts in that line.

Q. Did you find out whether they were or not? A. I did not make any special investigation of that. I have since the accident made an investigation, and I have reason to believe that it is as good a method of signals as can be obtained.

Q. On whose judgment did you rely in this matter? A. The man who had charge of the signals was Mr. Franklin. Mr. Wilgus, our chief engineer, on whose judgment we relied very strongly, has had charge of the installation.

Q. Has your reliance been placed on Mr. Wilgus or A. Franklin? A. On both of them.

Q. Were you aware of the qualifications which Mr. Wilgus had as an engineer? A. I have known him for a good many years. He is a young man who has had a great deal of experience.

Q. Is he a graduate of a technical school? A. I do not know.

Q. Do you know what qualification the engineer of this great system has to supervise or don't you? A. I believe he is fully competent for the position, and one of the best in the country.

Q. But you know nothing of his qualifications, do you, except this general impression? A. That is the way we get information on all people. By investigation and personal contact with the man.

Q. Now, have you discharged the duty, which you say is yours, of ascertaining whether or not this system is the best? A. By every known method. That is, by the selection of men who understand these things, by investigation of trains that pass safely through them and a general inquiry as to the character of the signals on the other parts of the line.

Q. Do you not consider it the duty of the road to keep the signalling system abreast of the art with every possible device to safeguard human life? A. And we consider it to have been done.

Q. The primary responsibility, then, devolves upon one man who has been experienced as a conductor, and upon another man thirty-six years of age who has never graduated from a school? A. I do not know whether he has graduated from a school or not.

Q. But he is your chief engineer, and he has got charge of these lights primarily, and people are being killed there, and you did not know before and do not know since what his abilities are? A. That is your opinion. I have answered your question and given you the fullest information.

Q. Well, as an experienced railroad man, what do you consider this accident to have been caused by? A. The failure of the man to stop when the signals were made.

Of course, the man who asked these questions must have known that they were mostly rubbish. From George Stephenson down we may follow a long line of great engineers who never saw a technical school; and if a man at 36 is not fit to take care of a railroad's signals age will never make him so. Likewise, many of the most distinguished managers in the United States and Great Britain have come up through the grade of conductor, or by a parallel course.

Those who have read the reports will remember that the point has been made that this was the engineman's first or second trip through the tunnel in charge of an engine, but that no force was put on the opportunity that he had had to learn the signals as a fireman; and that no attempt at all was made to bring out the essential point, that if the fixed signals are not seen, the train must be brought under control.

Finally, the engineman gets off without blame and without even being questioned. This is a direct blow to discipline and a threat to the safety of all who travel by rail.

We can pursue no further this sophistical and shallow examination. The record of it must fill the members of the Bar Association with shame.

No doubt, the verdict is "popular." We have not seen anything to the contrary in the newspapers, but wise men are pretty well agreed that the desire for popularity is one of the subtlest dangers in a republic. A great element in the popular prejudice against the company is an ancient but wide and deep misconception. When we discuss this matter in conversation the chances are more than even that we are met with an assertion that the New York Central has never made an improvement until it was forced to make it; and that the New York Central was one of the last of the great roads to put on the air-brake, and indeed only adopted the air-brake after a serious accident, and as a concession to public indignation. The discriminating and experienced observer will at once discount this feeling. He knows that it is the rule that communities shall be discontented and dissatisfied with the transportation companies which serve them. This is fundamental in human nature.

In the particular case now before us there has been reason for this feeling; perhaps more than usual reason. For many years the New York Central was largely officered and managed by men without liberal education and without professional training. In this the road was not peculiar; but the change in the spirit of its management has been slow, slower probably than on most of the important roads which enter great cities. But within the last few years the change

has been rapid. The professional idea of managing and working a railroad property has grown fast on the New York Central within quite recent years. The spirit and the staff are undergoing a revolution; and, like all durable and healthy revolutions, it is proceeding slowly and on natural lines.

But let us look for a moment at the common notion that the New York Central has been backward in enterprise and reluctant to adopt new things. There are few railroads in the world that are signaled better than the New York Central. It has been the aim of the management to have the most perfect protection by signals that the art of signaling can provide; and the testimony of every well-informed officer and signal engineer is that the signaling of the New York Central is to-day well up to the present state of the art. This applies to the tunnel as well as to the entire line.

The New York Central was the first railroad in the United States to use the high-speed attachment to the train brake. It was the first to put the high-speed brake into regular passenger service, and we are quite certain that no other railroad has more trains equipped with this attachment now than the Central. No railroad abroad has any trains so equipped.

It is probably safe to say that no other railroad in the country has done quite so much as the New York Central (including now the Michigan Central and the Boston & Albany) to advance practice in the metal-burgy and manufacture of steel rails. If this statement is not literally correct we should like to have the error pointed out; but it expresses our belief.

Within the last few years this railroad has contributed largely to progress in locomotive practice. Its passenger engines and its freight engines are among the best and the most advanced. This is also true of its passenger and freight cars.

The road has become famous all over the world for its passenger service. This high reputation is based on the number of its passenger trains, their elegance and comfort, their speed and punctuality. In such a matter it is hazardous to use superlatives, for there is a good deal that must be a matter of taste and opinion; but there are many people who hold the opinion that no other railroad in the world can excel the New York Central in the quantity and quality of its passenger service, and every observing student knows that this opinion stands upon pretty solid foundation.

On the whole, the candid and well-informed observer will agree with us that this old ground of prejudice no longer exists. We think that we can see some defects in the operation of the road; but they are an inheritance and are passing away fast.

The burden of the precise accusation now made against the New York Central Company in the matter of the tunnel is that it ought long ago to have done something to relieve conditions there. Surely we shall not deny this. The responsibility rests upon the company of demonstrating that it could not have gone faster in this important matter than it has gone; and yet let us consider the matter for a moment from the standpoint of the railroad company itself. What could have been done?

The first answer will be that the traffic could have been worked by electricity. The traffic probably could not have been worked by electricity at any time before, say, one or two years ago. Indeed, it is yet to be demonstrated that the electric art to-day is so far advanced as to successfully handle the traffic through the tunnel by electricity. There is no longer any room for serious doubt that by the time the tracks are ready to receive electric trains the method of handling and using the current will be so developed in detail as to make it reasonably successful. But there is no place in the world to-day where anything approximating the New York Central tunnel traffic is handled by electricity. Many great railroads have made serious studies of this subject and have stopped to wait until experience should be carried further. It must be obvious even to "the meanest intelligence" that the prodigious traffic in and out of the Grand Central Station cannot be made a matter of experiment. We shall not enter now into the details of this interesting and controversial subject, but simply present the fact that in waiting until now before equipping to work by electricity the New York Central has practically done what every steam railroad in the world has done. And we are not unmindful of the Orleans terminus in Paris when we say this. The volume of traffic there is too small to affect this statement.

The roof might have been taken off the tunnel. This is a quick, cheap and obvious way of making that place light, airy, and as safe as a line of such heavy traffic can be; but the property owners alongside would fight this to the last ditch.

It has been said that the tunnel could be ventilated, that is, that the smoke, gases and steam could be drawn out or blown out. First class engineering opinion, and plenty of it, says that this is impracticable. Up to this day no tunnel of this character, moving trains at such short intervals, has ever been ventilated. The Hoosac tunnel, with immensely less traffic, has been the subject of ventilating experiment for some years. The last that we heard, namely, some time within six months, nothing satisfactory had been found. The successful method of ventilating the Elkhorn tunnel, on the Norfolk & Western, has only been developed and patented within a year or two, and it is not demonstrated that the system could be successfully applied to the New York Central tunnel.

We state these facts not as conclusive, but simply by way of showing that the situation which confronted the management of the New York Central Railroad and the New York, New Haven & Hartford Railroad in the matter of this tunnel, was not so simple and easy as the writers for the daily newspapers (and we regret to say some of the technical newspapers) seem to think. Broad knowledge and actual responsibility modify one's opinion very much in a case so important as this.

It may be asked, then, if we think that the New York Central Railroad Company is beyond criticism, and has done everything that could be done to make the operation of the tunnel safe and comfortable. While we have no nostrum to present we are disposed to think that some things might have been done better; but those things were matters of discipline and train operation, and not of engineering.

December Accidents.

We publish in another column of this issue a condensed record of the principal train accidents which occurred in the United States in the month of December. The record contains account of 55 collisions, 43 derailments; and five other accidents. Those which were most serious, or are of special interest by reason of their causes or attending circumstances, occurred as follows:

4th, Dillerville, Ia.	11th, Essex, Mont.
7th, Malvern, Ark.	*19th, Sherman, Wyo.
8th, North Yakima, Wash.	*19th, Uplands, Cal.
*8th, Macon, Ga.	*24th, Dallas, Tex.
9th, Peru, Ind.	27th, Starlight, N. Y.
14th, Troy, Ohio.	*29th, Malta, Ill.
15th, Urbana, N. D.	29th, Reusens, Va.
*15th, Perryville, Ill.	

The accidents in which passengers were killed are indicated in this list by a dagger; and the cases in which the wreck was wholly or partly destroyed by fire are indicated by a star. It will be seen that the total number of passengers killed or fatally injured was 10. The worst passenger-train accidents were those at Perryville, Uplands, Malta and Malvern. The Malta accident was somewhat unusual, although it was due to a cause which is common enough. The other three were all butting collisions, and they have been the subject of extensive newspaper comment. The newspaper reader in New York, Detroit, Chicago or San Francisco, who has had to read a good deal about disastrous collisions during the past two months can, perhaps, form something like an adequate idea of the frequency of such accidents in the country as a whole if he will note that the people of each of the other three cities have had the same experience as himself. For ourselves, we can only say that these disasters, together with Franconia and Seneca, should, for all practical purposes, be put in one class. And the higher the record piles up the clearer does the fact appear that one comprehensive remedy is needed for the whole of them. This remedy has been stated so often that there is no occasion for repeating it here. The Perryville case affords a striking illustration of the increase in the danger attendant upon the movement of trains when the weather is extremely cold. When an engineman can see nothing at all ahead of his cab window—either the track by day or lights by night—the space-interval rule becomes, practically, a necessity, for even with plenty of time, a flagman must depend on torpedoes; and, if he has to remain out any great length of time he is liable to freeze to death. We have had occasion before now to point out this need, in the movement of trains in the snowy regions of the extreme north; but here we see about the same thing in a "temperate" climate.

The worst freight train accidents in the present record are those at Starlight, North Yakima and Troy, Ohio. The second one of these is due to a kind of mistake which seems to be as common as ever, and so far as the question of remedy is concerned this collision may be classed with those of passenger trains which we have just noted.

In addition to the collisions and derailments which we have emphasized by entering them in the foregoing table, one or two others are worthy of mention. The derailment near Wagoner, Ind. T., on the 2nd, is classed as unexplained, but in view of the fact that the engine was running with the tender ahead, this classification will be questioned by some. The bridge disaster at Newberry, Pa., occurred in the midst of a large town and at a time when the danger of damage to the bridge by flood

was understood by everybody. At the investigation by the coroner there was a good deal of discussion as to the measures that had been taken to warn approaching trains of the possible danger; and there was an effort to show that there had been neglect at some point between the track watchman and the superintendent.

Four employees were killed by a butting collision on the Canadian Pacific near Sault Ste. Marie, Ont., on the 25th. On the Canadian Pacific, near Vancouver, B. C., on the 6th, a freight train was derailed by a landslide, when running only about five miles an hour; but the engine fell down the mountain side 300 ft. and the engineman and fireman were killed.

The number of electric car accidents in the United States in December, as reported in the newspapers, was 32. In more than half of these cases the reports stated that no person was killed or injured; but the number of casualties for the month is considerable, nevertheless, there being ten killed and 49 injured. In one derailment, at Allentown, Pa., due to a car becoming uncontrollable on a grade, when the rails were made slippery by snow, five persons were killed and 10 injured. One of the derailments was to a freight car and one to a gravel train. No fewer than 10 of the accidents were at crossings with steam railroads, where a locomotive ran into a street car, or a street car ran into a freight or passenger train.

The recent fire in the tunnel of the Liverpool Elevated Railway, in which seven people lost their lives through the burning of an electric train, naturally made something the same kind of excitement in England that the New York tunnel accident has made here. The engineers of the Central London and of the City & South London were at once besieged by reporters and the newspapers were full of most alarming suggestions as to the perils of electric working. *The Engineer*, of Jan. 10, very properly points out that there is no occasion for the panic, and that if we waited for absolute security we should never travel. These Liverpool trains are worked with two motors, one at each end of the train. The motors are in series, so that the whole current passes from one end of the train to the other through an insulated cable. We have not yet received particulars showing the precise cause of the fire.

The Chairman of the Car Service Committee of the American Railway Association is now Mr. Arthur Hale, Assistant General Manager of the Baltimore & Ohio. Mr. Hutchinson, the former chairman, resigned that office at or about the time of the last meeting of the Association. Mr. Hale has had long experience in car service matters, having been a prominent member (and an officer) of the Car Accountants' Association when he was at the head of the car-record office of the Pennsylvania. He is also peculiarly well qualified for dealing with the knotty problem, full of questions which cannot be settled by precedent, that the committee is now wrestling with—the Per-diem problem.

NEW PUBLICATIONS.

Municipal Engineering and Sanitation. By M. N. Baker, Ph. B., C. E., Associate Editor, *Engineering News-Record*. The Citizens Library, 12mo., 317 pages, with index. New York: The Macmillan Company. 1902. \$1.25. This little volume is the ninth in the series known as the Citizens Library of Economics, Politics and Sociology, and this classification is alone sufficient to give a hint of its character. In his preface Mr. Baker says that the volume is intended for those officials or citizens who are striving to improve municipal conditions. Its design is as a review of the field of municipal engineering and sanitation and not as an exhaustive treatment of any branch. It is believed, however, that it will be useful even to professional engineers. The topics treated are broadly divided into: Means of communication; municipal supplies; collection and disposal of wastes; protection of life, health and property; administration, finance and public policy. Under each of these headings are several short chapters and the reader may well imagine about what they would be, as for instance, under municipal supplies mention is made of water, ice, milk, meat, light, heat and power. In the division given to protection the author treats of fire-protection, electrolysis, smoke, noise, water pollution, etc. Naturally, the engineer will not expect much very definite information in a book written from the standpoint here taken but he will doubtless find this one suggestive.

Cast Iron.—A Record of Original Research. By William J. Keep, M. Am. Soc. M. E., Etc. Octavo, xiii + 225 pages, 117 figures. New York: John Wiley & Sons. 1902. \$2.50.

We cannot give a better notion of the origin and purpose of this book than by a quotation from the preface: "In 1885 the author discovered that there was a relation between shrinkage and the composition of a foundry mixture, but not until the publication of Prof. Turner's discovery that the condition of carbon depended upon the proportion of silicon was it discovered that shrinkage varied inversely as silicon. Since that date the author, by his method of tests, has endeavored to discover the influence of the chemical elements in cast iron. In 1894 it became evident that the physical qualities of cast iron were not understood. The author, as member of the Testing Committee of the American Society of Mechanical Engineers, made extensive experiments to determine the physical properties of cast iron, the results of which are

reported in the Transactions of that Society. These were such a surprise that the committee was requested to prove the author's conclusions by tensile tests. Fortunately five series of Dr. Richard Moldenke's extensive tensile and compressive tests were completed before this volume was prepared, and have been used to meet this request. This volume contains the results of this whole line of research." The volume contains 24 chapters, the longest, and perhaps the most valuable to engineers in general, being the two chapters on the strength of cast iron and on impact tests. In other chapters the effect of the various elements is taken up and carefully analyzed. Methods of testing are described and the whole discussion is accompanied by copious records from actual experiments and observations. Thus the volume becomes an uncommonly useful handbook.

TRADE CATALOGUES.

Signaling the Boston Elevated.—The Union Switch & Signal Company has just issued a pamphlet of 42 pages, giving a good description of the signaling of the Boston Elevated Railroad. The Westinghouse Electro-Pneumatic Block Signal System is used. This fine installation was described at considerable length in the *Railroad Gazette* of Oct. 11 last. The pamphlet contains a diagram of the Boston Elevated lines, showing terminal and junction points, stations, interlocking towers and power centers. It also contains views of various stations, of signals, switches, etc., and engravings from photographs and drawings of the signaling apparatus. It is not necessary for us to attempt any description of this installation now as it was so recently described in these pages; but the pamphlet contains many illustrations which we did not show, and it should be in the files of all signal engineers and others who are likely to have to do with apparatus of this sort.

Train Accidents in the United States in December.*

re, 1st, 11 p.m., Rio Grande Western, Tucker, Utah, passenger train No. 4 ran into the rear of a preceding freight train, damaging four engines, three drawing the passenger train and one pushing the freight. One engine was injured.

bc, 1st, 5 a.m., Pennsylvania road, Sterling Run, Pa., butting collision of freight trains, wrecking both engines and 15 cars. One brakeman was killed and another fatally injured.

dn, 1st, 1 a.m., Philadelphia & Reading, Bound Brook, N. J., some long iron beams on a platform car in a freight train were displaced, apparently by the sudden checking of the speed of the train, and they projected at one side so that they came in contact with the truss of a large bridge. The shock weakened the bridge and several cars fell through to the stream below. The bridge of the Central of New Jersey, adjoining the Reading bridge, was considerably damaged.

unx, 1st, 10 p.m., Gulf, Colorado & Santa Fe, Pendleton, Texas, a freight train was derailed and several cars were wrecked. A man riding in one of the cars was injured.

re, 2nd, 2 a.m., Detroit & Mackinac, Emery Junction, Mich., a freight train which had been unexpectedly stopped was run into at the rear by a passenger train; and the engine and caboose were wrecked; four trainmen injured.

bc, 2nd, Baltimore & Ohio, Connellsville, Pa., butting collision of freight trains, wrecking both engines and several cars. Three tramps were injured.

unx, 2nd, Toledo, St. Louis & Western, Delphos, Ohio, a freight train was derailed and five cars were wrecked. Some of the cars fell against a passenger train. A brakeman was injured.

unx, 2nd, St. Louis, Iron Mountain & Southern, Wagoner, Ind. T., a locomotive running backward was derailed and overturned; engine and one brakeman killed and two other trainmen injured.

xc, 3rd, 5 a.m., Pennsylvania road, New Florence, Pa., a west-bound freight ran over a misplaced switch and into the head of an eastbound freight. Both engines and 10 cars were wrecked and one fireman was injured.

unx, 3rd, St. Louis, Iron Mountain & Southern, Mandeville, Ark., a northbound freight train was derailed by a loose or broken rail and the engine and two cars were derailed. Several hours afterward a southbound passenger train ran into the wreck and the engine and one baggage car were overturned.

o, 3rd, 8 p.m., Erie road, Elmira, N. Y., the locomotive of a freight train was badly damaged by an explosion in the fire-box; two trainmen injured.

bc, 4th, 4 a.m., Pittsburgh Junction road, Pittsburgh, Pa., butting collision of freight trains, wrecking 12 cars. eq, 4th, Northern Pacific, Sprague, Wash., a freight train was derailed by a brake-beam which broke and fell on the track, and 19 loaded cars were wrecked. The wreck took fire and was mostly burnt up.

o, 4th, Pennsylvania road, Dillersville, Pa., 18 wheels (all on one side) of the cars in eastbound passenger train No. 20 (first section) were damaged by a broken frog, pieces of the flanges from 1 in. to 3 in. long being broken out. Nobody on the train noticed the accident and the train, which was running about 30 miles an hour, continued nine miles, to Ronk, without any unusual incident. At Ronk it was stopped, the track inspector at Dillersville having telegraphed to that station. It is believed that the point of the frog, a piece about 5 in. long, was broken

when it was struck by the wheel of one of the postal cars in the train. The damage to the wheels was caused by this broken piece lodging in the flangeway.

o, 4th, 8 p.m., Chicago & North Western, Ives Station, Wis., the caboose of a freight train running at good speed took fire and was destroyed. With difficulty the trainmen succeeded in side-tracking the caboose. The men were all forward of the caboose at the time the fire started. Two of them who went back to get their coats were burned, one seriously.

bc, 5th, Birmingham Mineral road, Bessemer, Ala., a freight train ran into the rear of a preceding mixed train, which was standing at a water tank; caboose and one passenger car wrecked; 12 passengers injured.

bc, 5th, 6:30 p.m., St. Louis, Iron Mountain & Southern, Malvern, Ark., butting collision of passenger trains No. 3 and No. 14, wrecking both engines and the forward cars of both trains. Three passengers were killed and one trainman and 37 passengers were injured. It is said that one of the trains disregarded a meeting order.

xc, 5th, Southern Railway, Decatur, Ala., a freight train ran into a switching engine and both engines were wrecked; four trainmen were injured, one of them fatally. unx, 5th, Rockaway Valley road, Gladstone, N. J., a freight car in a mixed train was derailed while running at good speed on a descending grade; and after running over the sleepers for half a mile was ditched, piling up the rest of the train, including one passenger car. A number of passengers were slightly injured.

re, 6th, Baltimore & Ohio, Moundsville, W. Va., a freight train ran into the rear of a preceding freight, wrecking the caboose and several cars. A conductor was killed and his body was burned in the fire which broke out in the wreck.

xc, 6th, Canton, Ohio, a freight of the Wheeling & Lake Erie ran into a freight of the Cleveland Terminal & Valley, at the crossing of the two roads, ditching three cars.

unf, 6th, Oregon Railroad & Navigation Line, The Dalles, Ore., eastbound passenger train No. 2 was derailed by a piece of iron on the track, supposed to have been placed there maliciously, and the engine and mail car were ditched. Engine and fireman injured.

bc, 7th, Chesapeake & Ohio, Fayette, W. Va., butting collision of freight trains, wrecking both engines and several cars. One fireman and a tramp were killed and two other trainmen were injured, one of them fatally. It is said that the collision was due to the failure of an operator to deliver an order to one of the trains.

xc, 7th, New York Central & Hudson River, Ilion, N. Y., butting collision between an eastbound work train and a westbound freight. The work train was backing. One employee was killed and four were injured.

xc, 7th, 6 a.m., Sherman, Texas, a freight of the Texas & Pacific, ran into a freight of the Houston & Texas Central at the crossing of the two roads, and the engine was overturned; one fireman was injured.

xc, 7th, 10 p.m., Canton, Ohio, Pennsylvania passenger train No. 15, ran into a freight of the Wheeling & Lake Erie, at the intersection of the two roads, overturning two freight cars.

dr, 7th, Poughkeepsie & Eastern, Clinton Corners, N. Y., the locomotive of a passenger train was derailed at a spring-rail frog, which appears to have been weakened by a fracture due to frost, and the passenger cars at the rear of the train fell down a bank. All of the 40 passengers on the train escaped with very slight injuries.

unf, 7th, 5 a.m., Southern Pacific, Salem, Ore., a passenger train was derailed at a switch which had been maliciously misplaced, and the engine was overturned. The engine and the mail car fell into a creek. The fireman was killed and the engine man injured.

bc, 8th, Northern Pacific, North Yakima, Wash., butting collision between a northbound freight and southbound freight No. 54, wrecking three engines and 33 cars. Two trainmen were killed and five were injured. It is said that the men on the northbound train saw a train on the side-track at the last station which they had passed and assumed that it was No. 54.

unf, 8th, Southern Railway, Princeton, Ind., a freight train was derailed by running over some cattle, and the engine and four cars were wrecked. The engine man was injured.

unx, 8th, 4 a.m., Central of Georgia, Macon, Ga., a passenger train was derailed at a switch and the first four cars were ditched. Two baggage cars and one passenger car were burned up, and one passenger car fell down a bank. One passenger was killed and two trainmen and 15 passengers were injured. The cause of the accident was not discovered.

re, 9th, Santa Fe Pacific, Pinto, N. Mex., an empty engine standing at the water tank was run into at the rear by a freight, badly damaging both engines and six cars. Two trainmen and a tramp were injured.

unx, 9th, Cincinnati, Richmond & Muncie, Peru, Ind., a box car in a work train, in which were riding about 40 men, and which was being pushed in front of the engine, was derailed on or near a trestle bridge and fell part way down a bank. Nearly all of the men were injured by the fall or were burned by the stove, some of them seriously. The car took fire, but the injured persons were rescued by 40 men who had been riding in another car behind the engine.

xc, 10th, 1 a.m., Gulf, Colorado & Santa Fe, Bellville, Texas, a southbound freight train ran over a misplaced switch and into the header of a northbound freight, badly damaging three engines and several cars. One engine man and one fireman were killed.

dn, 10th, Hocking Valley, Delaware, Ohio, a locomotive was derailed at the derailing switch, at the approach to the crossing of the C., C. & St. L., and was overturned.

unx, 10th, Louisiana & Northwestern, Homer, La., the passenger car at the rear end of a mixed train broke through a trestle bridge and, with several freight cars, was wrecked; eight passengers were injured.

bc, 11th, Pennsylvania road, Walnut Bend, Pa., butting collision of freight trains, wrecking both engines and four cars, most of which fell into a river. One brakeman was drowned and two other trainmen were injured.

xc, 11th, Seaboard Air Line, Raleigh, N. C., collision of locomotives; two employees injured.

dr, 11th, Wabash road, Niantic, Ill., a passenger train was derailed by a broken rail, and two passenger cars were overturned in the ditch. One passenger was injured.

eq, 12th, Wheeling & Lake Erie, Jewett, Ohio, three cars of a freight train were derailed by the breaking of a flange of a wheel of one of the cars, and fell down a bank. The cars behind those which were derailed continued moving and were automatically coupled to those in front.

re, 13th, 5 a.m., Missouri, Kansas & Texas, Greenville, Texas, a freight train which had been unexpectedly stopped, was run into at the rear by a following freight. The caboose and two cars were wrecked and destroyed by fire, together with the combustible parts of the locomotive. Three trainmen were injured, one of them fatally.

xc, 13th, Baltimore & Ohio, Cumberland, Md., an empty engine became uncontrollable by the breaking of its throttle and collided with another engine. After the collision the first engine, having been reversed and deserted, ran back some distance until it came to a sharp curve, when it was derailed and fell down a bank. It struck a building and a man in the building was fatally scalded in the wreck.

bc, 14th, 4 a.m., Northern Pacific, Spiritwood, N. Dak., butting collision of empty engines, both running at good speed; three trainmen injured. It is said that the west-bound engine ran past a stop signal at Spiritwood Station.

bc, 14th, 9 p.m., Baltimore & Ohio, Layton, Pa., butting collision of freight trains, wrecking both engines and 12 cars. The wreck took fire and was mostly burned up.

xc, 14th, Baltimore & Ohio, Greenwich, Ohio, a freight of the Cleveland, Cincinnati, Chicago & St. Louis ran into a freight of the Baltimore & Ohio, wrecking one engine and 16 cars. A man standing on the station platform was killed.

unx, 14th, 5 a.m., Cleveland, Cincinnati, Chicago & St. Louis, Troy, Ohio, a freight train broke through the combination Howe truss bridge over the Miami River, and the engine and five cars fell into the stream. The fireman was killed and the conductor was injured. It is believed that the bridge was knocked down by a derailed car.

unf, 14th, Cleveland, Lorain & Wheeling, Bridgeport, Ohio, the engine of a freight train was derailed by running over a hand car, and fell down a high bank; the engine man and fireman were injured, the latter fatally. Seven freight cars were wrecked.

re, 15th, Baltimore & Ohio, Keyser, W. Va., rear collision of freight trains, wrecking caboose and three cars. The wreck took fire and was burned up. The engine man and one brakeman were killed.

15th, night, Northern Pacific, Urbana, N. Dak., an empty engine which had been stopped on account of a leak in the boiler, was run into at the rear by a following freight train; and the engine man of the freight was killed. The headlight of the freight engine had gone out and a lantern was being used in its place, and it is said that the engine man of the empty engine, being deceived by this light as to the distance from his engine to the approaching freight train, neglected to send out a man with a stop signal.

bc, 15th, 1 a.m., Illinois Central, Perryville, Ill., butting collision between eastbound passenger train No. 4 and a westbound freight train, both running at good speed. Both engines and several cars were wrecked. A car of oil in the freight exploded and all of the cars in both trains, except two, were destroyed by fire. One passenger and eight trainmen were killed and three passengers were seriously injured. The temperature at the time was about 20 deg. below zero, and the persons who escaped death in the collision suffered intensely from the cold. The freight train had wrongfully passed the point where it should have waited for the passenger. The conductor and engine man, both men of experience and satisfactory records, disregarded an order which told them just how much time they could use against the delayed passenger train. One seems to have miscalculated the time and the other acquiesced in his conclusion. The collision was on an open prairie, but it seems likely that the engine men (both now dead) failed to see the opposing train by reason of frost on the windows.

xc, 15th, Chicago Great Western, Bolton, Ill., an empty engine ran into the rear of a preceding freight train, which had been stopped by an accident, doing slight damage. The empty engine, having been reversed, immediately ran backward and into the head of a wrecking train which was following. In the second collision the fireman of the empty engine was killed.

dr, 15th, 6 a.m., Pennsylvania road, Newberry, Pa., a freight train broke through a bridge which had been weakened by a flood and the engine and nine cars fell into the stream. The engine sank in 20 ft. of water. The engine man, fireman, and one brakeman were killed. William Berger, a boy of 16 years, endeavored to stop the train by swinging a lantern, but it is said that his warning was not noticed.

eq, 15th, Erie road, Port Jervis, N. Y., an eastbound freight train was derailed by the breaking of a journal of one of the cars, and the car fell across the westbound track. A westbound train ran into the wreck and was derailed, 26 cars falling down a bank. A brakeman of the westbound train was killed and three other trainmen were injured.

15th, 2 a.m., Great Northern, Essex, Mont., a west-bound passenger train was derailed and five passenger and sleeping cars were ditched; one passenger car was overturned. One passenger was killed and five others were badly injured, one of them fatally. One account says that the rail joints had been tampered with.

o, 15th, Southern Railway, Keysville, Va., a car of oil in a freight train sprang a leak, and the conductor and a brakeman went to it with a lantern to see what was the matter; the lantern was carried too near and an explosion occurred, which wrecked the cars and injured the two men. The fire following the explosion blocked the road 14 hours. The explosion was seen and heard 20 miles away.

bc, 16th, Chicago Great Western, Oelwein, Iowa, butting collision between a passenger train and a work train. One engine man fatally injured.

bc, 16th, 8 p.m., Chicago, Milwaukee & St. Paul, La Crosse, Wis., butting collision between passenger train No. 2 and a switching freight; both engines, baggage car, mail car and two freight cars damaged. Three passengers injured.

re, 17th, Union Pacific, Solon, Wyo., eastbound fast mail train No. 102 ran into the rear of a preceding freight; engine and three cars wrecked. The wreck was mostly destroyed by fire; one fireman was injured.

re, 17th, 7 p.m., Erie road, Middletown, N. Y., a milk train ran into the rear of a preceding freight train. Six trainmen injured.

bc, 17th, Chicago, Milwaukee & St. Paul, Potter, Iowa, butting collision between passenger train No. 3 and freight No. 62, damaging both engines. A mail clerk was killed, and one trainman and seven passengers were injured. The trains collided near the point where they should have met and passed. It appears that the freight approached the station at uncontrollable speed.

o, 17th, Seaboard Air Line, Fairfax, S. C., an officer's car in a passenger train was badly damaged by an explosion of the heating apparatus, and the porter of the car was fatally injured.

eq, 18th, 3 a.m., Missouri, Kansas & Texas, Checotah, Ind. T., a freight train about to stop at a tank was partly derailed by a drawbar which was drawn out and thrown on the track, and three cars were ditched and wrecked. The fireman was killed.

re, 19th, Union Pacific, Sherman, Wyo., a rotary snow

*Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The tabular statement of totals will be omitted entirely, as a more complete report of the total number of accidents is to be published by the Interstate Commerce Commission. The separation of the classes is abandoned, but the classification will be indicated by the use of the following

ABBREVIATIONS.

- re Rear collisions.
- bc Butting collisions.
- xc Miscellaneous collisions.
- dr Derailments; defect of roadway.
- eq Derailments; defect of equipment.
- dn Derailments; negligence in operating.
- unf Derailments; unforeseen obstruction.
- unx Derailments; unexplained.
- o Miscellaneous accidents.

plow pushed by two engines ran into the rear of a preceding train of empty tourist sleeping cars, damaging the plow and several cars. The wreck took fire and nine sleeping cars were burnt up.

bc, 19th, 1 a.m., Southern Pacific, Uplands, Cal., butting collision between northbound passenger train No. 9 and southbound passenger train No. 10, wrecking both engines and several cars. One baggage car and two passenger cars were destroyed by fire. One express messenger and one fireman were killed, and three trainmen and 15 passengers were injured. The northbound train had run a short distance beyond the appointed meeting place. The engineman of this train had forgotten his meeting order.

re, 20th, Baltimore & Ohio, Scott Haven, Pa., a passenger train ran into the rear of a preceding freight; engineman, fireman, and one freight brakeman injured. The caboose and three freight cars were destroyed by fire.

bc, 20th, Northern Pacific, Western, Wash., butting collision of freight trains badly damaging both engines and ten cars. Two trainmen injured.

unx, 20th, Bessemer & Lake Erie, Houston Junction, Pa., a car in a passenger train was derailed and overturned, and three passengers were injured.

unx, 20th, 6 p.m., Northern Pacific, Garrison, Mont., a freight train was derailed and 15 loaded cars fell down a bank, most of them lodging in the Missoula River.

re, 21st, Philadelphia & Reading, Shamokin, Pa., a passenger train ran into the rear of a preceding freight damaging the engine and the caboose. The caboose was destroyed by fire. One trainman injured.

bc, 21st, Cleveland, Cincinnati, Chicago & St. Louis, Hazelrigg, Ind., butting collision between a northbound and a southbound freight train, wrecking both engines, the mail car and six freight cars. Two passengers and one trainman were injured.

unf, 21st, Erie road, Jersey City, N. J., an eastbound passenger train was derailed in the Bergen Tunnel, near its east portal, by rocks which had fallen from the roof and lodged on the track. Four passengers and the engineman and fireman were injured, the two latter being badly scalded.

At almost the same moment a westbound passenger train was derailed at the same point, but not much damage was done.

unx, 21st, Louisville & Nashville, Ridge Top, Tenn., a freight train was derailed on or near a trestle bridge and the engine and many cars fell about 130 ft. to the ravine below. The engineman and two brakemen were killed and the conductor was injured; the bridge was badly damaged.

track; 15 cars were wrecked. The brakeman was killed and three other trainmen were injured.

25th, 6 a.m., Atchison, Topeka & Santa Fe, Rincon, N. Mex., a passenger train was derailed and the engine fell down a bank. One trainman was killed and two were injured.

25th, Texas & Pacific, Silver Lake, Texas, a freight train was derailed and broke through a bridge, and 15 cars were wrecked. Two trainmen and two tramps were injured.

A passenger engine sent to assist in clearing the track was derailed and fell down a bank; and four of the men on it were injured.

unx, 25th, Erie road, Gowanda, N. Y., a freight train was derailed and the engine fell down a bank. The engineman was killed. Five of the wrecked cars were destroyed by fire.

bc, 26th, Cincinnati, Hamilton & Dayton, Wyoming, Ohio, butting collision between passenger train No. 31 and freight train No. 86, wrecking both engines and three cars. Four passengers and two trainmen were injured.

xc, 26th, Cincinnati, Hamilton & Dayton, Hartwell, Ohio, a southbound express train collided with a freight train, wrecking three freight cars. Four passengers and two trainmen were injured. There was a dense fog at the time.

xc, 26th, Delaware, Ohio, a freight train on the Hocking Valley road was run into by a freight of the Toledo & Ohio Central. Four cars were wrecked.

o, 26th, Atlanta, Knoxville & Northern, Madisonville, Tenn., an officers' car attached to the rear of a passenger train was set afire by the explosion of its heater, and was burned up.

bc, 27th, Erie road, East Honesdale, Pa., butting collision of freight trains, making a bad wreck. One fireman was killed.

dr, 27th, Colorado & Southern, Barela, Colo., passenger train No. 1 was derailed by a broken rail and three passenger cars were destroyed by fire. Four passengers were injured.

dn, 27th, New York, Ontario & Western, Starlight, N. Y., a freight train of 50 cars became uncontrollable on a descending grade and the engine and 44 cars of coal were derailed, some of the wreck falling down a bank. Four trainmen were killed. The train had 17 cars of air connected up; and had been controlled for about five miles after leaving the summit.

unx, 27th, 8 p.m., Chicago, Rock Island & Pacific, Anadarko, Okla. T., a freight train was derailed and 10 cars were wrecked. The wreck took fire and was mostly

a freight train was derailed at a washout, and the engine and eight cars were dched. The engineman was killed and the fireman fatally injured.

re, 30th, Pennsylvania Lines, Tiffin, Ohio, a freight train which had been unexpectedly stopped was run into at the rear by a following freight and five cars were wrecked. Four employees were injured, one of them fatally. There was a dense fog at the time.

dn, 30th, 4 a.m., Springfield, Ill., a southbound express train of the Illinois Central was derailed at the derailing switch, approaching the crossing of the Wabash road, and the engine was overturned. The engineman jumped off and was injured. It is said that the signalman, being suddenly awakened by a man from a Wabash freight which had been trying to arouse him by blowing the locomotive whistle, opened the derail (with the purpose of clearing the Wabash track) after the passenger train had passed the home signal; or after it had approached so near that it was too late to stop.

unf, 30th, Baltimore & Ohio, Long Run, W. Va., freight train No. 97 was derailed by a rock which had fallen on the track and the engine and four cars fell into a swamp, where they sank in the mud. The fireman and one brakeman were killed and the engineman was badly injured.

unf, 30th, 5 a.m., Southern Railway, Berclair, Miss., a passenger train was derailed by a tree which had been blown down and had fallen across the track. The engineman was fatally injured.

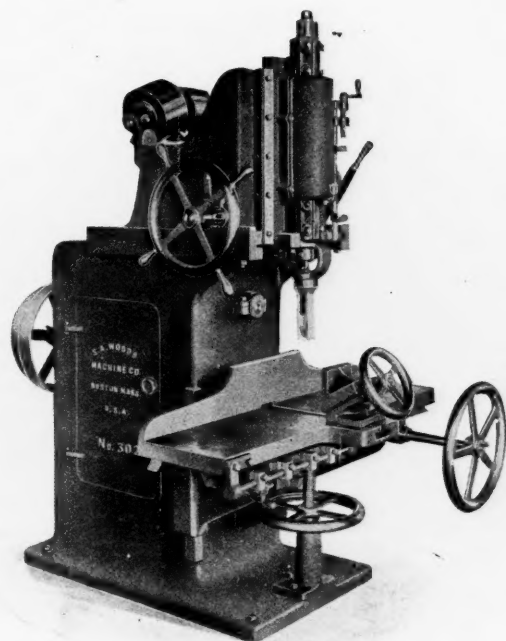
unf, 30th, Southern Railway, Remington, Va., a freight train was derailed at a washout and the engine and 11 cars were wrecked. The fireman was killed.

unf, 30th, El Paso & Northeastern, El Paso, Texas, a gravel train running backward was derailed by a rock which is supposed to have fallen from the same train on a previous trip, and several cars were wrecked. Two laborers were killed and three injured.

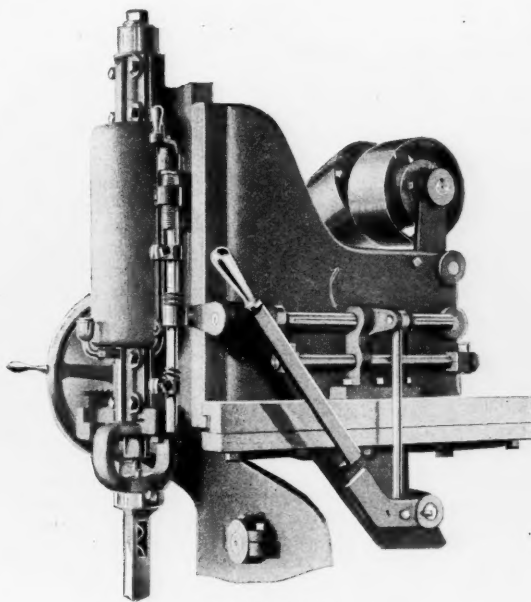
A New Hollow-Chisel Mortiser.

The illustrations show a new vertical automatic hollow-chisel mortiser which is now being offered to car builders and wood-workers in general by the S. A. Woods Machine Co. It is estimated that the hollow-chisel mortiser does cheaper and better work from four to ten times faster than the earlier types, and these advantages are thought to be especially attractive to railroad companies.

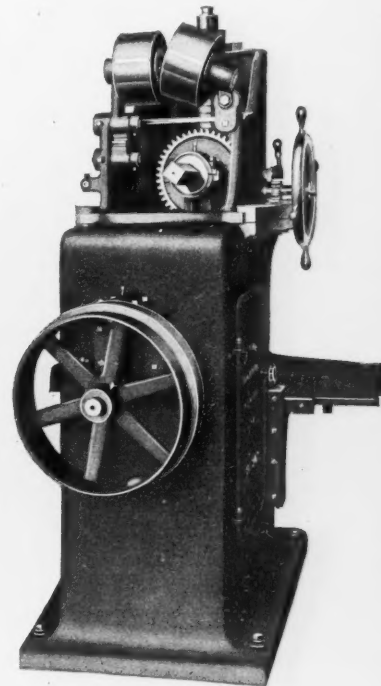
The mechanical development of this machine is thought



Front View.



Part Side View.



Rear View.

A New Hollow-Chisel Mortiser.

re, 22nd, Chicago & North Western, Little Suamico, Wis., a freight train which had stopped to take water was run into at the rear by a following freight and the engine, caboose, and eight cars were wrecked; the wreck took fire and was burnt up. Two employees of the road, riding in the caboose, were killed and their bodies were nearly destroyed.

xc, 22nd, 1 a.m., Northern Central, Freeland, Md., a freight train descending a grade broke in two, and the rear portion afterward ran into the forward one, wrecking 12 cars. One brakeman was injured.

xc, 22nd, Delaware, Lackawanna & Western, Scranton, Pa., a freight train which had become uncontrollable on a descending grade, collided with a locomotive in the yard, making a bad wreck. Three trainmen were injured.

unx, 22nd, 6 p.m., North Pacific Coast road, a train carrying officers of the road was derailed at a curve and the directors' car was overturned. Two of the men in the car were injured.

xc, 23rd, Central of New Jersey, Mateawan, N. J., an express train ran into a freight train at a crossing, wrecking one freight car. The fireman jumped off and was injured.

xc, 24th, Illinois Central, Fulton, Ky., passenger train No. 1 collided with a freight and 13 freight cars were wrecked. Two passenger cars were damaged. Four passengers and three trainmen were injured.

unf, 24th, 11 p.m., Missouri, Kansas & Texas, Dallas, Texas, northbound passenger train No. 34 was derailed on a trestle which had been weakened by fire, and the engine, just as it cleared the bridge, was dched and overturned. Two baggage and three passenger cars took fire from the burning bridge and were destroyed. The engineman and fireman and three tramps were injured. The contents of the baggage cars were saved.

xc, 25th, Southern Railway, Prentiss, Ga., freight train No. 52, traveling at good speed, ran over a misplaced switch and into some freight cars standing on a side-

burned up. A man stealing a ride was killed and four others were injured.

xc, 28th, Boston & Maine, Nashua, N. H., a passenger train ran into a freight near the station, damaging the engine and several cars. The wreck took fire, but the flames were soon extinguished. The engineman and fireman of the passenger train were killed and two other trainmen were injured. There was a dense fog at the time.

xc, 28th, Hamilton, Ohio, collision between a freight train of the Cincinnati, Hamilton & Dayton and a freight of the Pittsburgh, Cincinnati, Chicago & St. Louis at the junction of the two roads, wrecking both engines and four cars. One engineman was injured. The first-named train approached the crossing at uncontrollable speed.

xc, 29th, 5 a.m., Chicago & North Western, Malta, Ill., an eastbound freight train, moving on a sidetrack, was turned by a misplaced switch through a crossover and into the side of a passenger train, running in the same direction at high speed. Both engines were overturned and wrecked, and the passenger cars were badly wrecked. One passenger car lodged on or near the engines and many passengers were scalded by steam. All of the passenger cars, except one, were destroyed by fire. Three passengers and one trainman were killed and four trainmen and 20 passengers were injured.

xc, 29th, Southern Railway, Lynchburg, Va., a freight train descending a grade broke in two and the rear portion after ran into the forward one, wrecking 14 cars.

unf, 29th, evening, Chesapeake & Ohio, Reusens, Va., passenger train No. 9 was derailed by a landslide and the engine and cars were slightly damaged. While the trainmen and passengers were pushing a passenger car back from the wreck another landslide occurred and the baggage car was knocked into the James River. The conductor, engineman, baggage man, and express messenger, who were engaged in pushing the car, were killed.

unf, 29th, 1 a.m., Western of Alabama, Notasulga, Ala.,

to be further advanced than that of any machine previously built. The operator has complete control of the machine at all times, without changing his position. The following are some of its best features:

Patented lay out stops; improved step bearing for taking up end thrust of spindle and assisting in its support, this step always running in a bath of oil; a new device for instantly changing depth of mortise, as illustrated; automatic belt tighteners for spindle belt, as shown in the back view; a novel clamping arrangement for locking the chisel carriage into position.

The chisel carriage is provided with a cross or traverse movement with adjustable stops for regulating the travel. In this respect the machine is radically different from other medium-size mortisers and the advantage of this construction over the old way is apparent.

The table has both vertical and longitudinal movement. The chisel ram is vertically adjustable. The timber clamp is adjustable and detachable from the table. There is an improved friction feed with quick return, two rates obtainable. A patented pneumatic spindle pulley, which prevents air-cushioning of the belt, is used.

The following are working dimensions: The chisel ram has a vertical travel of 9½ in.; the chisel carriage has horizontal travel of 11 in. across the timber; the table has a longitudinal movement of 18 in., and will drop to mortise stock 17 in. high with 6½-in. chisel; timber up to 12 in. may be clamped and chisels up to 1½ in. can be used on hard wood. The required floor space is 5 ft. 8 in. x 4 ft.

TECHNICAL.

Manufacturing and Business.

J. A. Fay & Egan Co. has just received orders for some special wood-working machinery for the Pressed Steel Car Co.

The Chicago-Cleveland Car Roofing Co. will build a plant in Cleveland, Ohio, 100 ft. wide and 325 ft. long, one story high, to cost about \$25,000.

The Bucyrus Co., South Milwaukee, Wis., reports a large demand for its steam shovels for railroad work. Several good orders from foreign countries have lately been received. President Howard P. Eells adds that their business was never better.

The New York Bridge Company, a New Jersey corporation, with an authorized capital of \$500,000, has changed its name to the Metropolitan Bridge & Construction Company. Hector M. Hitchings is President; Melvin G. Pelliser, Secretary. The principal office is at 152 Elm street, Arlington, N. J.

Wood & Co. have started in business in Chicago at 440 Marquette Building, as buyers and sellers of all classes of locomotives and cars. E. H. Wood and W. B. Huskey are the partners and are well known in their line of business. Mr. Huskey was for several years with Fitzhugh & Co., Chicago and New York.

The Chicago Pneumatic Tool Company report that since their reorganization orders for compressors, pneumatic tools and appliances, including cranes and hoists, received from the 1st to the 15th inst. equal the total December business, which was greater than that of any preceding month. This includes an order for 80 tools from the Cramp Shipbuilding Co.

At the annual meeting of the stockholders of the Pyle-National Electric Headlight Company, held Jan. 8, the following were elected directors for the ensuing year: Chas. H. Deere, Moline, Ill.; Edward E. Ayer, Chicago; Granger Farwell, Chicago; James Vilas, Jr., Chicago; Wm. F. Vilas, Madison, Wis.; Royal C. Vilas, Chicago; Wylie H. Vilas, East Orange, N. J.

E. E. Silk, who has been associate editor of the *American Engineer* for the past two years, has resigned that position and will represent the O. M. Edwards Co., Syracuse, N. Y., after Jan. 31. Formerly Mr. Silk was in the motive power department of the Central Railroad of New Jersey with Mr. William McIntosh. The experience obtained there and acquaintance made with railroad men in his later work will naturally help him in his new field.

H. W. Armstrong, who, for more than 20 years, has been General Manager of the Verona Tool Works, severed his official connection with that firm on the first of the year to accept the Presidency of the James H. Baker Mfg. Co., of Pittsburgh and Tarentum, manufacturers of a general line of forgings. James H. Baker is Vice-President and General Manager, and H. M. Brackenridge is Treasurer. The capital of the company has been recently increased to \$500,000. They expect to take up new lines of forgings, particularly in the railroad business, as Mr. Armstrong is a graduate of the Pennsylvania Railroad, having served an apprenticeship as machinist, apprentice draughtsman and master mechanic. He has also had some experience in the steel business, having been at one time connected with the Crescent Steel Co.

Iron and Steel.

The Des Moines Bridge & Iron Works has increased its capital from \$40,000 to \$75,000.

The Southern Pacific Company is reported to have ordered 75,000 tons of 80-lb. rail.

The Crucible Steel Company of America will locate its new office in the Frick Building, in Pittsburgh.

The Portland City & Oregon Ry. wants 35 miles of 56 or 60-lb. relaying rails for a contemplated new line.

The Virginia Bridge & Iron Company, of Roanoke, Va., will increase its capital stock from \$100,000 to \$200,000.

The Sprague Rolling Mills, owned by the Centennial Mills Company, of Portland, Ore., and Spokane, was burned on Jan. 24, causing a total loss.

Chester Griswold, President of the Crown Point Iron Company, and director in several other companies, died at his home in New York City on Jan. 23.

The American Steel Hoop Company has given notice that the price for bar iron is now \$1.00 per 100 lbs. for present delivery. This is an advance of \$2 per ton.

The American Foundry & Machine Co., of Cleveland, Ohio, was incorporated in Delaware on Jan. 27, with \$300,000 capital stock. The object of the company is to mill and smelt iron and steel.

The American Steel Wire Co., one of the constituent concerns of the United States Steel Corporation, has opened an office in the Tradesmen's National Bank Building at Fourteenth and Wood streets, Pittsburgh, Pa.

Andrew Welch, of Youngstown, Ohio, formerly of the Bessemer plant of the Republic Iron & Steel Co., has been appointed Master Mechanic of the rolling mills of the American Car & Foundry Company's plants at Detroit and St. Louis.

Richard Henry Lee, Superintendent of the steel plants of the Colorado Fuel & Iron Co., has been appointed Superintendent of the blast furnaces. E. J. Rust, heretofore Chief Engineer of the steel works, has been appointed Superintendent of the Minnequa plant.

It appears, says *The Iron Age*, that the rail mills now

have on their books for 1902 delivery about 2,350,000 tons, which is pretty near the full capacity, and under the circumstances it is not surprising that the Mexican Central order for about 35,000 to 40,000 tons has gone abroad.

W. R. Clifton, of Mingo Junction, has been appointed Superintendent of the Sharon Steel Company's blast furnaces, to succeed G. R. Johnson, who goes to Joliet, on Feb. 1. Elmer Billings has been appointed Superintendent of the wire nail mill to succeed Chas. Lutz, resigned.

L. C. Straight has been elected President, F. W. Beck, Jr., Secretary, and W. I. Moody, General Manager of the American Rolling Mill Corporation, which was organized at the beginning of this year. The capital has been increased to \$1,000,000. The company operates mills at Muncie, Ind., Muskegon, Mich., and Sandwich, Ill.

The American Malleable Casting Company, Chicago, has been reorganized as the American Malleable Iron Company. John H. Palmer is President and Burton Smith Secretary and Treasurer of the new company. The capital is \$200,000. The works of this company at Chicago Highlands, Ill., have an annual capacity of 20,000 tons.

Sir Wheatman D. Pearson, President of the British contracting firm of S. Pearson & Son, which concern is building the Tehuantepec Railway, and doing other important work in Mexico, arrived in New York on Jan. 29, and will spend a few days in the city before leaving for Mexico. Mr. Pearson's concern is a large buyer of material in the United States for its Mexican undertakings.

Elbert H. Gary, Chairman of the Executive Committee of the United States Steel Corporation, has been elected Chairman of the Board of Directors of the Allis-Chalmers Company. He was one of those to assist in the formation of the company nearly a year ago, and was one of the directors. William Allis, who retires, with General Superintendent Edwin Reynolds, says ill health is the principal cause.

Guest, Keen & Co., of Dowlais and Cardiff, who recently absorbed the Cyfarthfa Iron Works and collieries, have, it is announced, made arrangements to acquire the business of the Nettlefolds, big screw wire manufacturers of Birmingham. Guest, Keen & Co. have already acquired the big steel works of Crawshaw Bros., at Merthyr Tydvil. The properties already taken over by this concern include collieries with an output of 1,500,000 tons annually, large iron and steel works, and large interests in mining properties in Spain.

At the annual meeting of the Cambria Steel Company, held in Philadelphia, Jan. 2, the following officers were elected: President, Powell Stackhouse; Vice-President, John W. Townsend; Secretary and Treasurer, W. D. Robinson; Assistant Secretary and Treasurer, Alexander P. Robinson; General Manager, Charles S. Price. The following directors were elected: George F. Baer, Theodore N. Ely, Frank J. Firth, Leonard C. Hanna, Effingham B. Morris, Powell Stackhouse, Edward T. Stotesbury, John W. Townsend and R. Francis Wood.

Two-Cylinder Compounds for the N. Y., N. H. & H. The American Locomotive Co. is building 10 two-cylinder compound switching locomotives for the New York, New Haven & Hartford. They are duplicates of 10 six-wheel locomotives built at Schenectady in August, 1900. This statement is of importance in the light of the increasing favor of compound engines, and the strength and variety which is now evident in the volume of orders and difference of classes. The weight of these locomotives is 131,000 lbs.; steam pressure, 200 lbs.; the cylinders are 20½ and 31 x 26 in., and the driving wheels are 51 in. in diam.

Standard Steel Car Company.

Contracts have been let by John M. Hansen, President of the recently organized Standard Steel Car Co., for some of the machinery for the new plant that will cost \$500,000. The plans for the buildings are being made and the contracts let are for three presses varying in capacity from 200 to 1,000 tons from the Mackintosh-Hemphill Co., of Pittsburgh; punches and shears, from Hilles & Jones Co., of Wilmington, Del., and riveters to be made by the Chambersburg Engineering Co. The electric apparatus will be made by the Westinghouse Electric & Manufacturing Co., and the electric cranes will be furnished by the Shaw Crane Co., of Muskegon, Mich. Shipments of this machinery must be begun within three months, and it is expected that the plant will be in operation by July 15. It is proposed to make 50 steel cars a day.

Continuous Rail Joint Company.

The Continuous Rail Joint Company of America, which has shops at Troy, N. Y., and Chicago, Ill., has in contemplation building a mill in Newark, N. J. Plans are now being made, it is said, for works that will require about 30 acres of land.

Locomotive and Car Shops for the Canadian Pacific. An officer of the Canadian Pacific Railway says that the company has in contemplation building locomotive and car shops in the east end of Montreal, which will employ about 7,000 men. The Dominion Government has approved an issue of \$20,000,000 of capital stock of the company, subject to the approval of the shareholders. Of this new issue it is proposed to spend \$1,500,000 on the proposed new shops, at which will be concentrated all

repair work except that done at Carlton Junction, north of Ottawa. The company has been negotiating for land for some time and is now said to have 600 acres. Among other improvements contained under the new issue will be new elevators and terminal improvements at \$3,000,000.

Big Oil Tanks on the Southern Pacific.

A Sacramento press note says that great preparations are being made on the Southern Pacific for using oil fuel in locomotives. It is said that oil storage tanks of 625,000 gals. capacity are being built, one each at Marysville and Willows, Cal., and that a tank of 1,250,000 gals. capacity is going up at Sacramento. We gave an illustrated description of oil-burning apparatus used on Southern Pacific locomotives, in our issue of Jan. 24, page 56. The present information, taken with what was then given, indicates quite fully the strength of the movement towards oil fuel.

Signaling Notes.

The Michigan railroad commissioner has approved the derail and signals at the crossing of the Corunna coal mine branch of the Detroit, Grand Haven & Milwaukee with the main line of the Ann Arbor road at Corunna.

Work is now in active progress on the electro-pneumatic interlocking at the new Union passenger station at Pittsburgh. The number of levers which will be used in controlling the signals and switches at this terminal will be greater than that at any other station in the United States. It is said that the contracts for this work will amount to \$160,000. It is now expected to have the new station and yard finished by the first of next June, though the bridge over the Allegheny River will not be done before October.

The New York Central, in making changes in the block signals at various points between Albany and Buffalo, and in the installation of interlocking where the switches have heretofore been worked by ground stands, is abandoning some of the very small cabins which were built on the signal bridges when the block signals were established several years ago. Wooden frame cabins have been put up at the side of the road. In some cases bracket posts, at the side of the road, have taken the place of metal bridges across the tracks, a re-arrangement being found desirable in connection with the signaling of the side-tracks and cross-overs. It is not true, however, that metal bridges are being abandoned because they are not as durable as had been expected.

MacPherson Switch & Frog Company.

The plant of the MacPherson Switch & Frog Co., at Niagara Falls, N. Y., has been finished. The building is 185 ft. long and 80 ft. wide and fitted with the latest patterns of machinery for making switches and frogs and other railroad specialties. A contract has been let for a building on the Canadian side of the river, at Niagara Falls, Ont., which it is expected, will be ready for business by June 1. The company has on hand a large number of orders calling for installations of the MacPherson patent switch and frog, some 600 of which are now in use on the railroads of the United States and Canada.

The Georgia Car & Manufacturing Company.

The Georgia Car & Manufacturing Company, situated conveniently in the South for making freight cars, box and flat cars, also logging trucks, has recently added to its equipment and made alterations to the plant which will greatly increase the capacity. The company has just taken some orders from the Brunswick & Birmingham R. R., Brunswick, Ga.; the Orange & Northwestern, Orange, Texas, and the Plant System, of Savannah. Those desiring quotations on the kinds of cars made by this company will have their inquiries promptly attended to by addressing the Savannah office. At the recent stockholders' meeting R. C. Foster was elected President and General Manager.

Electric Headlights.

We are somewhat surprised to learn that the Pyle-National electric headlight is in use on over 2,000 locomotives and on 110 railroads. The use of this headlight is growing steadily. The company now charges \$200 to equip a locomotive, and this includes cab lights and lights under the running board, all of which make the inspection and care of the engine much easier.

Mechanician for the Bureau of Standards.

On Feb. 26, an examination will be held for the position of Chief Mechanician to the National Bureau of Standards. The duties of this position will be to construct and design scientific apparatus, and the appointee must have knowledge of the fundamental principles involved and ability to organize and supervise the work of others. The salary is \$1,400 a year. Applicants must have had at least five years' actual experience as instrument makers. Further information may be had from the United States Civil Service Commission, Washington, D. C.

The Tripper Attachment for Signals.

In the last issue of the *Railroad Gazette* appeared an article by S. S. Neff, relating to the New York Central accident, suggesting a method for automatically stopping trains (illustrated by sketch C). No doubt, if such a device were used with the signal system, particularly in places where for various causes the lights or semaphores are liable to be obscured, greater safety would be obtained than by the use of an audible signal, which requires the application of the brakes by the engineer, and which may fail in its usefulness because of a defect

tive torpedo or because the man does not immediately apply the brakes. But the suggestion is not new. Such a device was invented over 20 years ago, and is the subject of patent No. 231,511, dated Aug. 24, 1880, and re-issue No. 9,614, dated March 22, 1881. Both have been owned by the Westinghouse Air Brake Company for 20 years, but no use has been made of them for reasons that have often been discussed.

Pressed Steel Car Co.

At the annual meeting of the Pressed Steel Car Company, held in New York, on January 22, three new directors were elected, viz.: Henry Phipps, G. E. Macklin and F. G. Ely. The Schoen interests are now entirely out of the property. During the year ending Dec. 31, 1901, the company built 24,592 steel cars; of this number 2,937 were steel under-frame cars; also 15,264 truck frames, and 69,499 bolsters. There are orders on hand for 3,550 steel under-frame cars and 2,575 steel underframes, which latter will be shipped to other car builders. Last year cars were shipped to Cape Colony, Spain and New South Wales. The showing is not as favorable as was expected, the profits for the year, before dividends and depreciation, amounting to \$1,927,925—a decrease from 1900 of \$147,256. This is generally attributed to competition, which has decreased profits on car building. In 1900 the company paid 6 per cent. on its common stock, but in 1901 the rate was reduced to 4 per cent., making the total disbursement for common dividends \$750,000 in 1900 and \$500,000 in 1901. After allowing for dividends, depreciation and renewals, the company on Dec. 31 had a surplus of \$1,700,172—a decrease of \$112,113 from the corresponding date in 1900. The balance sheet shows \$5,000,000 first mortgage gold notes, an obligation that did not appear in the 1900 statement. These notes were created in February, 1901, to provide increased working capital. On the other hand, bills payable of \$2,755,000 in the 1900 exhibit were eliminated in the current statement.

THE SCRAP HEAP.

Notes.

The Boston & Maine has contracted with the International Correspondence Schools of Scranton, Pa., for courses of instruction for the employees of the road. One of the air-brake instruction cars of the Schools will be sent to the Boston & Maine periodically.

The San Francisco *Call* says that the Southern Pacific, which has heretofore paid cash for its advertising in country newspapers, will hereafter ask the publishers to accept transportation instead. They will be given "all the transportations that they may wish in reason."

The Interstate Commerce Commission has at least one good quality, persistence. It is still prosecuting in the United States Courts, in California, the suit begun many months ago based on the decision of the Commission in May, 1895, that the Southern Pacific and Union Pacific should not charge more than 65 cents on sugar from San Francisco to Omaha, while the rate from Kearney, Neb., to Omaha was 50 cents.

The Corporation Counsel of the City of New York advises the Mayor that the contract between the city and the New York & Harlem Railroad, made in 1832, under which the city could prescribe what motive power should be used in propelling trains through the tunnel, is now of no effect, the powers of the city in this respect having been abrogated by the law of 1872, providing for the improvement of the tunnel; also by certain other State laws.

The Central Railway Clearing House, at Buffalo, which keeps the records of all of the joint freight business of the Vanderbilt roads, including the billing to and from a number of other roads, some of them extending to the Pacific coast, is the subject of a descriptive article in the *Buffalo Express*, of Jan. 19. Mr. Nicholson, the manager of the Clearing House, intimates that very likely the accounting for the joint passenger business of the roads interested may be handed over to the Clearing House in the near future. The freight earnings dealt with by this office amount to about 25 million dollars a year. The Clearing House has now been in operation nearly three years. The force of clerks numbers 225. An account of the working of this establishment is given in the *Railroad Gazette* of May 24, 1901.

At Washington, Jan. 27, the Supreme Court heard arguments for and against the application of the State of Minnesota for an injunction against the Northern Securities Company, owner of a majority of the stocks of the Northern Pacific and the Great Northern railroads. The arguments in behalf of the State of Minnesota were substantially the same as those which have already been outlined in the *Railroad Gazette*. The Northern Securities Company was represented by Mr. W. D. Guthrie. He claimed that the court had no jurisdiction, as the complaint does not present a controversy of a civil and judicial nature between a State and a citizen of another State. The court is asked to prohibit, in New Jersey, acts which are entirely lawful in that State. No relief is sought against the Great Northern Railroad or the Northern Pacific; this is a confession that neither road has violated the laws nor the Constitution of Minnesota. Minnesota does not forbid individuals or partnerships to hold stock of competing railroads. The alleged threatened injury is declared to be altogether remote and fanciful. Mr. Griggs, formerly Attorney General, also spoke for the Northern Securities Company. He said that

Minnesota was asking the assistance of a Federal Court in the enforcement of its own police laws.

Traffic Notes.

Press despatches of Jan. 27, repeating in substance what was given out on Jan. 22, reported an agreement among the executive officers of the roads west of Chicago to hereafter publish all of their rates, including those on packing house products and export freight, which have been cut by secret concessions all of the time for a year or so past. The agreement is said to include also a clause, signed by the leading provision shippers, binding these shippers not to accept contracts at less than the published rates. It is said that the railroads signing are the Gould roads, the Harriman roads, the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy, the Illinois Central, the St. Louis & San Francisco and the Chicago Great Western. These have agreed to issue imperative orders forbidding traffic officers to grant cut rates. The provision and packing houses signing are said to be Armour & Co., Swift & Co., Nelson Morris & Co., the Cudahy interests, the G. H. Hammond Company, the Ruddy Bros., Swarschild & Sulzberger, the Anglo-American Provision Company and the Omaha Packing Company.

According to the *Montgomery Advertiser*, the Louisville & Nashville is going to plant, in Alabama, a garden of 900 acres with watermelons, beans, peach trees and other things which will promote freight traffic to Northern States.

The United States Supreme Court, on Jan. 27, in a case concerning the clause of the Constitution of the State of Kentucky, which embraces the long-and-short-haul law, decided that where the longer haul is through parts of two States the Constitution does not apply; to this extent it is void.

The Atchison, Topeka & Santa Fe has notified the fruit shippers that before the citrus fruit season of next year, its contracts with refrigerator car companies will expire; and that thereafter the company will have enough refrigerator cars of its own to carry the fruit. The company intends to so adjust its rates for ice as not to make a profit on the refrigeration charges.

Chairman Reagan, of the Texas State Railroad Commission, has made a public statement explaining why he does not agree with the majority of the Commission in ordering a reduction in freight tariffs. He thinks that for distances from 25 miles to 50 miles, the new rates are much too low; for distances less than 25 miles they are unreasonably low; and there is an unnecessary reduction on distances above 186 miles. This action, says Mr. Reagan, reverses the former policy of the Commission, which was to preserve competition between Texas merchants and those of other States. The new rates are likely to unfavorably affect the construction of new railroads. Moreover, the rates on cotton ought to be reduced before a reduction is made in the rates on general merchandise.

I. C. C. Decision—Wilmington vs. Norfolk.

The Interstate Commerce Commission, in an opinion by Commissioner Clements, has announced its decision in the case of the Wilmington, N. C., Tariff Association against the Cincinnati, Portsmouth & Virginia and a number of other roads. The relation of freight rates from Chicago, St. Louis, Cincinnati, Louisville and other western points to Wilmington, as compared with rates from the same points to Norfolk, Richmond and other Virginia cities, was the subject of this controversy. Rates from Cincinnati and Louisville to Norfolk are much lower than those from St. Louis and Chicago to Norfolk, and the competitive conditions at Cincinnati and Louisville appear to be of the same general character as at Chicago or St. Louis. The same is true of rates to Wilmington from Cincinnati, Louisville, Chicago and St. Louis. No substantial difference appears to exist except that of distance, which favors Cincinnati and Louisville. Carriers north of Cincinnati, Louisville and other Ohio River points, obtain in most instances shares of the rates to Wilmington, which equal their local charges, while they accept much less than their local rates on traffic destined to Norfolk and other Virginia cities, and the rates charged by carriers south of Norfolk, Richmond or other Virginia gateways on Wilmington business are upon a high basis.

The present rates from Chicago, St. Louis, etc., to Wilmington deprive that city in its competition with Norfolk, Richmond and other Virginia cities of some of the benefits of those primary markets and limit Wilmington to such intermediate points of supply as Cincinnati and Louisville, from which points the rate relations appear to be fair and reasonable; and this subjects Wilmington to disadvantages which are in substantial degree undue and unreasonable and for which the defendant carriers are to that extent responsible.

The decision of the Commission is that what constitutes just rate relations from Cincinnati and Louisville to Norfolk and Wilmington is a fair basis for relative rates from St. Louis and Chicago, and that basis should be adopted, with the modification in favor of the carriers that the readjustment may be made on the basis of East St. Louis rates, and the established practice of charging practically the same rates from St. Louis and Chicago to Wilmington continued; that substantial compliance with such rule of adjustment would result by making the rates from Chicago, St. Louis and East St. Louis to Wilmington, 135 per cent. of the rates in force from East St. Louis to Norfolk.

For a Union Station at Buffalo.

According to reports from Buffalo, Edward H. Butler, representing the Buffalo Union Station Committee, has had interviews with the presidents of all the railroads entering that city, in regard to building a union station. The New York Central asks that the Hamburg Canal, from Hamburg street west to Main street, be filled and given to the railroads; that the city and the railroads buy the property bounded by Exchange, Main, Scott and Washington streets, the eventual ownership to be determined later; that in the station built thereupon all the railroads at present entering Buffalo shall have the right to come on terms agreed upon between them and the New York Central, the city to have no voice in the matter of terms, not even to the arbitration of differences. The railroads will decide whether any new road shall be admitted. In event of the first two features being agreed upon President Newman promises to at once take up the proposition with the other roads and push matters to a conclusion as speedily as possible. In the

event of the failure of the negotiations the New York Central will build its own new station in Exchange street on plans already prepared, but this work will be delayed some years and preparatory to it the roof of the present station will be taken off and sheds built out over the tracks as a makeshift.

An Electric Train Fire.

The *Herald's* European edition last Saturday published the following:

"Parisians had a scare the other day, when volumes of smoke were seen issuing from the Marbeuf and Alma stations of the Metropolitan Railway. The motor of a train caught fire and the blaze spread. The train pulled up under the Champs Elysées and the passengers were told to get out of the tunnel as best they could. No one was hurt, but the train was destroyed by the flames. All who assisted at their extinction were nearly asphyxiated. Even after traffic had been re-established passengers suffered from the smoke, which hung in the tunnel for hours."

To Assist Italian Immigrants.

It will probably be of some interest to railroad officers and contractors to know that the Society for the Protection of Italian Immigrants which was organized last March to afford advice, aid and protection of all kinds to Italian immigrants, and generally to promote their welfare, has established a labor bureau to check certain abuses. The Society is in touch with a number of contractors and would like to hear from railroad companies and industrial organizations of the country who want to employ Italian workmen. The office of the Society is 17 State street, New York.

New Line of Steamers to Newfoundland.

The Boston & Newfoundland Steamship Co. has been recently incorporated, to operate a line of steamers sailing semi-weekly between Boston and St. John's, by way of Halifax. The directors are: H. B. Robinson, Edward T. Fearing, Richard J. Morrissey, John B. Orr, George W. Young and William A. Alexander, of Boston.

Large Cars for Maine.

The Portland & Rumford Falls, as recently reported in the *Railroad Gazette*, is having a number of steel cars of 100,000 lbs. capacity built by the Pressed Steel Car Co. It is said that these cars are the first of 100,000 lbs. capacity to be bought by any New England road.

Telephones on the Illinois Central.

For some time past the Illinois Central has been sending train orders by telephone on the seven miles between Council Bluffs, Ia., and Omaha, Neb.; also on a portion of the lines at New Orleans, and temporarily on a short section at Chicago during the elevation of the St. Charles Air Line. As used at these points, there is no change in the order of proceeding, the only difference being that the telephone is used instead of the telegraph to transmit orders and messages. Now the company intends to equip about 1,000 miles with long-distance telephones for the purpose of the operating department, and the telephone system will be used in conjunction with the existing telegraph lines. If this proves satisfactory, all the Illinois Central lines will be equipped with long-distance telephones.

The foregoing is the basis of fact on which the daily papers have built such marvelous headlines recently about the abandonment of the telegraph on the Illinois Central.

Popular Engineering Lectures.

Prof. William H. Burr, of Columbia University, will shortly deliver a series of popular lectures on civil engineering subjects in the Great Hall of the Cooper Union, New York City. These lectures are entirely free, and are delivered in co-operation with Columbia University. No tickets of admission are required, and the doors will be open from 7:15 to 8 p. m., after which no person will be admitted. The lectures are all to be illustrated by stereopticon views. They are to be delivered on Tuesdays, beginning with Feb. 4, and running every week to March 11. The subjects of these six lectures will be: Ancient Civil Engineering Works, Bridges, Water Works for Cities and Towns, Some Features of Railroad Engineering, Nicaragua Route for the Isthmian Ship Canal, Panama Route for the Isthmian Ship Canal. The University will publish these lectures in one volume, and in the printed form they will be considerably expanded. Obviously, the most strictly technical part must be omitted in lectures designed for the audience that it is expected to secure on these evenings. One must recognize the industry and the energy of a gentleman so busy as Prof. Burr in getting up and delivering his course of lectures.

New Car and Locomotive Shops.

During the past week there were reports which indicated that several new locomotive and car building shops will be built. In another column we mention the shops proposed by the Canadian Pacific Railroad. A report from Tacoma says that local capitalists have organized a company to establish a large plant in that city to make freight cars of Washington fir. From Hammond, Ind., a report comes that the local Board of Trade is negotiating with Chicago promoters who contemplate establishing locomotive and car building shops in Hammond, using the old building formerly used by the Corning Steel Company.

Train Robbery in South Carolina.

On the night of Jan. 27 a passenger train of the Southern Railroad was stopped by robbers near Branchville, S. C., and the two safes in the express cars were carried off in a wagon. It is said that there were seven of the robbers; that they boarded the train at a station getting on to the front of the car next to the engine, and then crawled into the cab when they reached the spot where they wished to stop. The express cars were detached and run about a mile ahead from the passenger cars before the safes were taken out. It is said that one of the safes was found the next day in a river, unopened. The passengers were not molested.

Department of Commerce.

The United States Senate on Jan. 28 passed the bill establishing the Department of Commerce and Labor, which has been under discussion for several days. At this writing it is not clear just what bureaus it is proposed to transfer to the new Department, but the amendment proposed by Senator Hale to include the Interstate Commerce Commission was withdrawn.

LOCOMOTIVE BUILDING.

The Chicago, St. Paul, Minneapolis & Omaha is having 10 locomotives built at Schenectady.

The Quebec & Lake St. John has ordered 13 engines for February delivery from the Baldwin Works.

The Northern Pacific is having 10 locomotives built at the Richmond works of the American Locomotive Co.

The Iowa Central order for locomotives with the American Locomotive Co., to be built at Schenectady, reads as follows: Six simple moguls, August delivery, gage 4 ft. 8½ in.; weight on drivers, 125,000 lbs.; total weight, 142,000 lbs.; diameter of cylinders, 20 in.; stroke of pistons, 26 in.; diameter of drivers, 63 in.; extended wagon-top boilers, working steam pressure, 200 lbs.; iron tubes, outside diameter, 2 in.; Otis steel fire-boxes; tank capacity, 5,000 gals.; coal capacity, 8 tons; Westinghouse air-brakes, iron axles, Cooke & Strong bell ringers, Streeter brake-shoes, Standard couplers, Wabash steel headlights, Ohio and Hancock injectors, U. S. metallic piston rod and valve rod packing, Ashton safety valves, Leach sanding devices, Nathan sight-feed lubricators, Scott springs, Ashton steam gages, Standard Steel Company's driving wheel and truck wheel tires.

CAR BUILDING.

The Pullman Co. is building four coaches for general service.

The Illinois Central is having 10 coaches built at the Barney & Smith works.

The Cuba Co. has ordered 50 flat cars from the American Car & Foundry Co.

The American Car & Foundry Co. is building 270 wagons for foreign railroads.

The Detroit Southern has ordered 50 stock cars from the American Car & Foundry Co.

The Baltimore & Ohio is having 65 freight cars built at the South Baltimore car works.

The Cincinnati Southern order, reported last week, has been increased by 300 box cars.

The National Car Co. has ordered seven car bodies from the American Car & Foundry Co.

The St. Louis Portland Cement Co. is having 22 freight cars built at the Detroit Car Works.

The El Paso & Rock Island has ordered one private car from the American Car & Foundry Co.

The International & Great Northern has ordered 50 tank cars from the American Car & Foundry Co.

The Arizona Copper Co. has ordered eight narrow gage dump cars from the American Car & Foundry Co.

The Georgetown & Western has ordered 50 flat cars from the Georgia Car & Mfg. Co., of Savannah, Ga.

The Southern has ordered 50 coke and 100 coal cars from the Georgia Car & Mfg. Co., of Savannah, Ga.

The Harrisburg Traction Co. has ordered four street car bodies from the American Car & Foundry Co.

The Mississippi River & Bonne Terre has ordered 100 box and 25 dump cars from the American Car & Foundry Co.

The Manhattan Elevated (New York) has contracted with the Wason Company, of Springfield, for remodeling 900 cars.

The Philadelphia & Reading is having 30 coaches built by Osgood, Bradley & Co., Worcester, Mass., and 10 built at Wilmington.

The Chicago Great Western has ordered two baggage cars and one combination baggage and mail car from the American Car & Foundry Co.

The Missouri Pacific has ordered a private car from the American Car & Foundry Co., and two standard ballast distributing cars from the Rodger Ballast Car Co.

The Mexican National order, reported Jan. 17, includes four first class coaches, four second class coaches, 14 third class, six combined first and second, six combination baggage, mail, and express cars, and six baggage cars.

The Rock Island & Peoria has ordered 10 34-ft. 40-ton convertible ballast and flat-bottom gondola cars, and one standard Rodger ballast distributing or plough car, equipped with double ploughs. These are for April delivery.

BRIDGE BUILDING.

AKRON, OHIO.—The city is considering the feasibility of building a bridge over the canal connecting Main street and Wooster avenue. A committee has the matter in hand.

ARAPAHOE, OKLA. T.—Bids are wanted, Feb. 24, by Wm. B. Walker, County Clerk, for four steel or combination bridges over Deer Creek in Custer County.

ARKANSAS.—On Jan. 21 the U. S. Senate passed bills authorizing the Memphis, Helena & Louisiana Railway to build two bridges across the Arkansas River in Arkansas.

The Senate also passed a bill on Jan. 21 extending the time within which the Mississippi River, Hamburg & Western Ry. is authorized to build a bridge across the Bayou Bartholomew, in Arkansas.

A bill was introduced in the U. S. Senate, on Jan. 27, authorizing the Eldorado & Bastrop Ry. to build and maintain a bridge across the Ouachita River in Arkansas.

BALTIMORE, MD.—The Maryland & Pennsylvania Railroad has applied to the Baltimore County Commissioners for right to extend several bridges over several county roads.

BELPRE, OHIO.—The Little Kanawha Valley R. R. proposes to build a bridge over the Ohio River at this place.

BOZEMAN, MONT.—Bids are wanted until March 5, by E. V. Blankinship, County Clerk, for a steel bridge over East Gallatin River.

CASTOR, VA.—Bids are wanted until March 3 for building a 333-ft. bridge of two spans over Staunton River. C. L. DeMott, Engineer, Lynchburg.

CINCINNATI, OHIO.—The Committee on Track Elevation announces that a proposition has been submitted to the railroads which is to be agreed upon by Feb. 3, which requires that the city pay 35 per cent. and the railroads 65 per cent. of the cost.

CLEVELAND, OHIO.—The Clerk of the County Commission will receive bids until March 15 for building a 92-ft. (stone) skew arch over Euclid Creek, to cost \$22,000.

COLUMBIA, VA.—Bids will be received by John W. Holland, at Wilmington, Va., until Feb. 10, for a steel bridge over Rivanna River. Bridge will be located 12 miles from the Columbia station of the C. & O.

COLUMBUS, GA.—It is stated that the contract for the 759-ft. bridge over Chattahoochee River will be let next month. The estimated cost is \$40,000.

DAYTON, OHIO.—A bill has been introduced in the State Legislature to permit the city of Dayton to issue \$120,000 of bonds for building two new bridges.

DES MOINES, IOWA.—It is said that the Interurban Ry. is receiving bids for bridges along the line to Colfax.

DOVER, N. J.—Plans are said to have been made for the abolishment of grade crossings on the Lackawanna Railroad in Dover.

DUBOISTOWN, PA.—The County Commissioners have taken up the project for a steel bridge between Newberry and Duboistown. It will cost between \$90,000 and \$100,000.

DULUTH, MINN.—The city has received estimates on the cost of rebuilding the long wooden viaduct over swamps and railroad track in the West End. It is estimated that a new wooden viaduct will cost \$26,000 and that a steel structure will cost \$100,000.

EL RENO, OKLA. T.—The city is considering building a bridge over South Canadian River, at a cost of about \$8,000.

ELIZABETH, N. J.—The Elizabeth & Plainfield City Ry., according to report, will soon build a viaduct over the Lehigh Valley tracks at Pickton.

ELIZABETHTON, TENN.—Carter County will build three bridges. George E. Boren is chairman of the Bridge Committee.

EUFULA, IND. T.—We are told that bids will be wanted soon for the steel bridge to be built over South Canadian River by the Eufaula Bridge Co., recently incorporated. F. W. Ahrens is interested.

FALL RIVER, MASS.—The Legislature has been asked to make an appropriation towards the new bridge to connect Fall River and South Somerset.

GALESBURG, ILL.—The Peoples' Traction Company will need six or seven bridges and culverts on its proposed line between Galesburg and Abingdon.

GOODLETTSVILLE, TENN.—Bids are wanted at once by A. R. Mather, at this place, for a steel bridge over Manskrees Creek.

GRAND RAPIDS, WIS.—A committee has been appointed to get plans and estimates for a steel bridge over Wisconsin River.

HANNIBAL, MO.—The Hannibal Ry. & Electric Co. proposes to build a bridge over Bear Creek, near Main street.

INDIANAPOLIS, IND.—The County Commissioners want bids for a bridge across Eagle Creek in Pike Township. Estimate, \$7,000.

INDIANAPOLIS, IND.—The County Commissioners have agreed to pay part of the cost with the Indiana, Shelbyville & Southeastern Traction Co., for a stone bridge at New Bethel.

KANSAS CITY, MO.—A bill was introduced, Jan. 24, in the House of Representatives, authorizing a bridge across the Missouri River at or near Kansas City, Mo.

LAWRENCEVILLE, GA.—The County Commissioners are reported considering building a bridge at Rock Bridge.

MADISONVILLE, TENN.—A bill has been introduced in the House of Representatives to permit a steel bridge to be built in place of the present wooden structure across Little Tennessee River at Nile Ferry, between Blount and Monroe counties.

MATANZAS, CUBA.—Bids will be received until March 6, at the office of the District Engineer in Matanzas, for building a freight house, pier, railroad and bridges at Matanzas. Information can be had from John S. Winn, Captain of Cavalry, U. S. A., Matanzas.

MOORESBURG, TENN.—G. W. Williams, of this place, will soon receive bids for a bridge in the county.

NELSON, BRITISH COLUMBIA.—A steel bridge will be built to replace the wooden structure across the Cootany River, a few miles south of this place. A steel bridge may also be built at the Slocan Crossing.

NEW CARLISLE, OHIO.—The Big Four, according to report, will put in a large girder bridge near this place. The company is said to have other bridges in contemplation on the Peoria and Eastern Division.

NEWARK, N. J.—The contemplated work of the Lackawanna in this city includes a new bridge over the Passaic River, an ornamental bridge across Broad street, a new railroad station and the elevating and depressing of tracks. The work will cost about \$3,000,000; of this the city will pay \$600,000.

NEWTON, MONT.—Bids are wanted until Feb. 6 for a combination bridge over Fox Creek. Address the County Commissioner.

NORMAN, OKLA. T.—The Board of County Commissioners will receive bids at this place, Feb. 11, for nine bridges of the following lengths: Thirty-foot, 40-ft., 46-ft. and 60-ft., on 12-ft. legs; also one 125-ft. cable bridge on steel tubes.

NORTH WALES, PA.—The City Council is reported considering building a bridge over the Northern Pennsylvania R. R., at Pennsylvania avenue.

OACOMA, S. DAK.—The U. S. Senate, on Jan. 23, passed a bill extending the time for the commencement of a bridge across the Missouri River at or near Oacoma, S. Dak., to July 1, 1906, and its completion to July 1, 1906.

OMAHA, NEB.—The Illinois Central Railroad, which recently bought controlling interest in the Omaha Bridge & Terminal Co., will put in a new draw span, 520 ft. long, in the bridge over Missouri River.

The Union Stock Yards Company has made a proposition to the city to build a viaduct over the tracks leading to the stock yards. This is the viaduct referred to in our last Construction Supplement, which was proposed over G street, in South Omaha. The estimated cost is \$80,000.

The Chicago, Rock Island & Pacific will, according to local report, build a bridge across Jefferson street, South Omaha.

OTTAWA, ONT.—The City Council is reported considering building a bridge over the canal at Somerset street.

PITTSBURGH, PA.—Four bids were received for removing the old Tenth street bridge. That of C. M. Driver was \$8,773.37; J. E. Walsh, \$9,700; American Bridge Company, \$9,975, and Cronin & O'Herron, \$10,800. The contract was awarded to C. M. Driver.

The Wabash Railroad will soon let the contract for the substructure of its bridge over the Ohio River, at Mingo. This will require about 15,000 cu. yds. of masonry. The superstructure was let some time ago to the American Bridge Company. A steel viaduct on the Ohio side will have to be built, but details for this have not yet been decided upon.

Bids will be received until 10 a. m., on Feb. 5, at the office of the City Controller, for rebuilding the substructure and the superstructure of the Lincoln Avenue bridge. Plans and specifications may be had of the Director of Public Works. This bridge will be 472 ft. long and cost about \$165,000.

PLATTSBURGH, NEB.—Recently we mentioned the fact that a pontoon bridge was proposed over Missouri River

at this place, and that Mayor T. E. Parmele was interested. The Mayor writes us that the bridge will be about 800 ft. long and cost \$15,000, and that he would like to learn from pontoon bridge builders.

RACINE, WIS.—We are told that the city of Racine has two bridges in contemplation.

RICHMOND, VA.—The County contemplates issuing \$12,000 of bonds with which to build bridges.

ROME, N. Y.—The city is asked to pay part of the cost for a bridge over the Erie Canal at South James street and at Washington street. The James street bridge will cost about \$20,000 and the Washington street bridge \$22,000.

SCRANTON, MISS.—Contracts will be let on March 3 for a bridge over Little Red Creek. F. H. Lewis, Clerk.

SOUTH BEND, IND.—The City Engineer has recommended that new bridges be built over the river at Colfax avenue, over Spring Brook at Springbrook Park, and over Bowman's Creek at Pennsylvania avenue; and also suggests that a bridge be built over St. Joseph's River at Washington or Jefferson streets, or at Colfax avenue.

ST. JOHN, KAN.—The County Commissioners are considering building a bridge over Rattlesnake Creek, for which bids will be wanted April 7.

ST. JOSEPH, MO.—The U. S. Senate, on Jan. 21, passed the bill authorizing the Chicago, Rock Island & Pacific Railway to build a railroad bridge across the Missouri River at or near St. Joseph, Mo. If built as a draw bridge it shall be a pivot draw bridge over the main channel of the river, with spans not less than 200 ft. in the clear on each side the pivot clear of the draw, and not less than 10 ft. above extreme high water. If built with unbroken spans it shall be not less than 50 ft. above high water and shall have at least one channel span of not less than 400 ft. clear water-way, all other spans over the water to be at least 300 ft. in the clear. The bill contains the usual provisions for the approval of all plans or proposed changes by the Secretary of War.

ST. MARYS, OHIO.—Bids are wanted, until Feb. 14, 11 a. m., by G. A. Orphal, County Auditor, Wapakoneta, Ohio, for a steel bridge of two 75-ft. spans.

ST. PAUL, MINN.—Bids are wanted until Feb. 4, for enlarging the Harriet Island bridge over the Mississippi River. Matt. Jansen, City Clerk.

SYRACUSE, N. Y.—George G. Metz, City Clerk, writes us that a bridge is proposed at Franklin street by the New York Central R. R., and that the city has set aside its share of the appropriation to build a bridge at Willow street, over Oswego Canal.

TACOMA, WASH.—The Chamber of Commerce is agitating for a bridge across the Puyallup River on Eleventh street, instead of the bridge on Twenty-first street, as previously contemplated. The approximate cost is \$25,000.

TERRE HAUTE, IND.—The County Commissioners are again considering the question of building a bridge over Wabash River at Wabash avenue. Plans for a steel bridge were made last year, but now the commissioners are considering building a concrete-steel bridge. Prof. M. A. Howe and Prof. J. E. Starbuck made the plans.

TOLEDO, OHIO.—The Wheeling & Lake Erie proposes to make some extensive improvements between Massillon and Toledo, which includes new bridges.

TOWANDA, PA.—The county is preparing to rebuild nine bridges which were destroyed by floods in December.

TUCSON, ARIZ.—The El Paso, Phoenix & California Southern R. R., recently incorporated, will need a bridge about 700 ft. over Salt River, a 1,000-ft. bridge over Dila River and one 800 ft. long over Hassawampa River. John A. Kurtz, of Phoenix, is interested.

WARBURG, TENN.—Morgan County contemplates building a steel bridge over Bear Creek. Address R. Kison, Warburg, Tenn.

WASHINGTON, D. C.—In the U. S. Senate, on Jan. 27, Senator McMillan introduced a bill providing for rebuilding the Aqueduct Bridge at a cost of \$800,000, one-half the cost to be paid by the District of Columbia, and the work to be done under the direction of the Secretary of War. Some work was done on some piers of this bridge during the past three years, but while it is now quite safe for the present use, it is not strong enough to bear the added weight of electric cars which it is desired to run over it, and a new modern bridge is needed.

WASHINGTON, PA.—Viewers from Washington and Greene counties have selected the site for the proposed highway bridge over Ten Mile Creek, between the counties. The bridge will be a steel structure of 135-ft. span.

WATERLOO, IOWA.—Plans are being made for the bridge on Bridge street, over Cedar River. It will be 520 ft. long, probably of seven spans, and it is expected that the County Commissioners will want bids at once. The estimated cost is \$50,000. J. R. Vaughan is Secretary of the General Committee.

WESTBORO, ONT.—Three iron bridges are proposed over Jack River, in Nepean Township, at a cost of \$10,000. F. W. Herfer, Clerk.

WICHITA, KANSAS.—The County Commissioners have completed plans for a steel bridge crossing the Little Arkansas River in Valley Center Township. The bridge will have two 85-ft. steel spans. Bids are wanted.

WILLIAMSPORT, PA.—Plans are being made by the Pennsylvania R. R. for a bridge over Lycoming Creek. The bridge which was destroyed was of two span, total length 213 ft., but it is proposed to have the new bridge of three spans.

WILLIAMSPORT, IND.—Bids are wanted, Feb. 14, for a viaduct 430 ft. long, on the Independence and Green Hill road. W. H. Genomer, County Engineer.

WILMINGTON, DEL.—Local report says that the Pennsylvania Railroad will ask at once for bids for some bridges needed in Wilmington, in connection with its plan to eliminate the grade crossings.

WINCHESTER, WIS.—We are told that bids will soon be wanted by J. D. Hough for a steel bridge over Rat River.

WOOSTER, OHIO.—We are told that Wayne County will need about 20 bridges this summer. John W. Cutter, President of the Board of County Commissioners, will let the contracts.

Other Structures.

BIRDSBORO, PA.—The E. & G. Brooke Iron Co. has let the contract to L. H. Focht, of Reading, for its new steel foundry. The building will be of brick and iron, 248 x 220 ft., with an addition, 62 x 140 ft. The plans were made by S. V. Huber & Co., of Pittsburgh.

CHARLESTON, W. VA.—The Chesapeake & Ohio Ry. has decided to make extensive improvements at Charleston. A station at Charleston will cost \$25,000.

DUBOIS, PA.—Julian Kennedy, of Pittsburgh, is mak-

ing plans for the new furnaces of the Rochester & Pittsburgh Coal Co., to be built between Falls Creek and Dubois. The furnaces will be 80 x 19 ft., and will operate on foundry iron. This is one of the projects of the Buffalo, Rochester & Pittsburgh Ry. It is expected that the furnaces will be finished early in 1903.

DUBUQUE, IOWA.—The Chicago Great Western will enlarge its roundhouse here. The company proposes to spend about \$150,000 on improvements this year in this vicinity.

JENISON, MICH.—The Detroit Construction Co., which is building quite a number of electric railroads in the vicinity of Detroit, will build car barns in the spring at Jenison, and later on may make it their headquarters, with repair shops, etc.

PITTSBURGH, PA.—The American Sheet Steel Co. will spend about \$1,000,000 on extending its plants early this spring, for which plans are reported under way. E. W. Fargney is manager. Practically all the important plants of the company are to be enlarged, with additions to heavier gage mills.

Jones & Laughlin, Ltd., have bought ground in Pittsburgh, to provide room for an extension to the works. An extension to the structural mill will be made first. The open hearth and blooming mills are now building.

SMITHVILLE, TEXAS.—The Missouri, Kansas & Texas proposes to enlarge its shops here, also to enlarge the roundhouse.

URBANA, ILL.—The Cleveland, Cincinnati, Chicago & St. Louis proposes to add new machinery to the shops at this place; and will receive bids in a few days for other work to be done at these shops.

WICHITA, KAN.—The Wichita Bridge Co., which is building a bridge building plant in this city, will soon be in the market for the entire equipment of bridge building machinery.

WILMINGTON, DEL.—Fire on the night of Jan. 27 destroyed the Patterson shops of the Philadelphia, Wilmington & Baltimore; estimated loss, \$50,000.

WINSTON-SALEM, N. C.—Negotiations are under way with the Mayor by outside capitalists for a location for a plant to make railroad and street cars.

WORCESTER, MASS.—Officers of the Boston & Albany and New York Central are reported considering plans for a new freight office and an addition to the present freight house in this city.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvii.)

Railway Signaling Club.

The next meeting of this club will be held on Tuesday, March 11, at the Great Northern Hotel, Chicago. No meeting was held in January.

Illinois Society of Engineers and Surveyors.

The seventeenth annual meeting of this Society was held at Joliet, Ill., Jan. 22 to 24. A long and interesting programme of papers and discussions was presented. An excursion was made to Lockport to inspect the controlling works of the sanitary canal, and to the water power plant of the Economy Light and Power Company. A night visit was made to the Illinois Steel Company's works.

American Society of Civil Engineers.

Wednesday, Feb. 5.—At this meeting a paper by Ernest P. Goodrich, Jun., M. Am. Soc. C. E., entitled "The Supporting Power of Piles," will be presented for discussion. This paper was printed in the *Proceedings* for December.

Wednesday, Feb. 19.—At this meeting a paper by Walter Loring Webb, Assoc. M. Am. Soc. C. E., entitled "Some Devices for Increasing the Accuracy or Rapidity of Surveying Operations," will be presented for discussion. This paper was printed in the *Proceedings* for December, 1901.

Wednesday, March 5.—At this meeting a paper by George S. Morison, Past-President, Am. Soc. C. E., entitled "The Bohio Dam," will be presented for discussion. This paper is printed in the *Proceedings* for January.

Wednesday, March 19.—At this meeting a paper by C. A. P. Turner, M. Am. Soc. C. E., entitled "Thermo-Electric Measurement of Stress," will be presented for discussion. This paper is printed in the *Proceedings* for January.

The thirty-fourth annual convention of the Society will be held at Washington, D. C., beginning on Tuesday, May 20.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. W. W. Follett, of Colorado, has been appointed by the President and confirmed by the U. S. Senate as Consulting Engineer for the United States on the International Boundary Commission provided for in the convention with Mexico, March 1, 1889.

—Mr. C. W. Booth, the new Purchasing Agent of the Wisconsin Central, succeeding Mr. Whaling, has been connected with this company for 11 years. He commenced his railroad career in 1883, when he entered the service of the Northern Pacific as a clerk to the general car foreman. Six months later he was transferred to the office of the Superintendent of Motive Power. Mr. Booth was born near Detroit 36 years ago.

—Mr. J. A. Gibson, whose entire railroad service has been with the Peoria & Eastern, and who has just recently been appointed Division Master Mechanic, was born in Vermillion County, Ill., in 1863. When 21 years of age he started his career as a fireman with the Peoria & Eastern, commonly referred to as the Peoria Division of the Cleveland, Cincinnati, Chicago & St. Louis. In 1890 Mr. Gibson was promoted to engineer. Three years later he became road foreman of engines.

—The new Assistant Engineer of the Pittsburgh Division of the Pennsylvania Railroad, Mr. James Buckelew, is 38 years old. He was born in Jamesburg, N. J., and graduated as a civil engineer from Princeton in 1885. The same year (1885) he became a rodman on surveys and construction for the Pennsylvania. The following year he was transferred to the maintenance of way department. Four years later (1890) he was appointed Supervisor and from then until 1895 Mr. Buckelew has held similar positions on different divisions. In 1901 he became Assistant Engineer of the Tyrone Division, from which position he was promoted to the Pittsburgh Division the first of this year.

—Mr. W. G. Nevin, General Manager of the Lines of the Atchison, Topeka & Santa Fe West of Albu-

querque, died suddenly of heart disease at his home in Los Angeles, Cal., Jan. 28, aged 47 years. Mr. Nevin's railroad career dated from 1876. He was for four years a clerk for the Atchison, Topeka & Santa Fe. From this he steadily rose, through the positions of Material Agent, Purchasing Agent, Assistant to the General Manager, Assistant to the First Vice-President, to the position of General Purchasing Agent of the "Atchison." Two years afterwards (1897) he became General Manager of the Santa Fe Pacific, and later assumed a similar position on the San Francisco & San Joaquin Valley. In February last, owing to ill health, Mr. Nevin was granted a six months' leave of absence.

—Mr. Charles T. Means, who was Superintendent of the Manchester (N. H.) Locomotive Works until their absorption by the American Locomotive Co., in June last, died at his home, in Manchester, Jan. 25, at the age of 46 years. Mr. Means was for many years identified with the Manchester Locomotive Works and, while he preferred to hold the modest title of Superintendent, was recognized as the practical head of the company. Indeed, the ultimate success of the works was due largely to Mr. Means' administration. So far as his intercourse with railroad officers went he was thoroughly liked, but his work took him little outside of New England. Mr. Means was, up to the time of his last illness, identified with both state and national politics, and the same modest disposition which was characteristic of the man caused him to repeatedly decline nominations to Congress and for the office of Governor.

—Mr. David McCargo, who, for 24 years, was General Superintendent of the Allegheny Valley (Pennsylvania), died Jan. 25, at Atlantic City. Mr. McCargo was born at Pittsburgh, Pa., June 6, 1835. He began with the Pennsylvania in 1857 as Superintendent of Telegraph. After leaving the telegraph department he became Assistant Superintendent of the Pittsburgh Division. In 1865 he was appointed Superintendent of the Oil Creek, and in 1866 Superintendent of the Milwaukee & Minnesota. In 1867 he returned to the telegraph service, as General Superintendent of the Pacific & Atlantic Telegraph Company. For two years (1874-1876) he held the position of Vice-President and Receiver of the Oil Creek & Allegheny River, which was reorganized as the Pittsburgh, Titusville & Buffalo. Mr. McCargo became General Superintendent of the Allegheny Valley in 1875, which position he held until ill health compelled him to retire.

—Mr. Joseph Marshall Graham, Chief Engineer of the Baltimore & Ohio, whose jurisdiction was recently extended over the Southwestern Division of the Baltimore & Ohio Southwestern, is a native of Indiana, having been born at Crawfordsville, May 15, 1850. For three years (1870-1873) he was engaged in various railroad and city surveys in Indiana and Illinois.

In the last-named year he became Assistant Engineer of the Graysville & Mattoon and the Charlestown, Tuscola & Vincennes. In 1874 he held a similar position on the Bedford, Springfield, Owensburg & Bloomfield. This position he held for one year and at the end of that time (1875) he became Chief Engineer. He then went with the Danville, Olney & Ohio River as Chief Engineer, later going to the Chicago, Texas & Mexican. In 1882 he returned to the Danville, Olney & Ohio River as General Superintendent, but shortly resigned to go with the Northern Pacific. From 1888 to 1890 Mr. Graham was Chief Engineer and General Manager of the Northern Pacific & Manitoba. In September, 1891, he became Superintendent of the Baltimore & Ohio, later being promoted to the position of General Superintendent, which position he held until 1899, when he received the appointment of Chief Engineer.



ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—The jurisdiction of W. J. Murphy, General Manager of the Cincinnati, New Orleans & Texas Pacific (Queen & Crescent), and M. F. Molloy, Auditor, is extended over the A. G. S., succeeding F. S. Gannon and A. H. Plant, respectively, resigned. Charles Patton has been appointed Assistant Treasurer. The operating headquarters of the A. G. S. will, after Feb. 1, be at Cincinnati, Ohio. Samuel Spencer, President of the Southern, is President of both these companies.

Atchison, Topeka & Santa Fe.—G. W. Smith, Master Mechanic of the "Santa Fe Coast Lines," which is now the official name for that part of the Santa Fe System west of Albuquerque, has resigned.

Augusta Southern.—F. K. Huger has been appointed Superintendent, succeeding A. Gordon Jones. (See Southern.)

Denver & Rio Grande.—J. H. Rathbone has been appointed Assistant Division Master Mechanic, succeeding John Kelker, resigned. J. Irwin has been appointed Assistant Division Superintendent, with headquarters at Salida, Colo., succeeding Wm. D. Lee.

Erie.—Henry E. Gilpin, heretofore Assistant General Manager at Cleveland, Ohio, has been appointed General Superintendent of the Ohio Division and the Chicago & Erie R. R., with headquarters at the same place. George T. Slade, heretofore Assistant General Manager at New York, becomes General Superintendent of the Erie Division, with headquarters at New York. The position of Assistant General Manager has been abolished, effective Feb. 1.

Gulf & Ship Island.—J. H. Thompson has been appointed Consulting Engineer.

Indiana, Illinois & Iowa (Lake Shore & Michigan Southern).—The new Directors of this company are: W. K. Vanderbilt, W. H. Newman, H. McK. Twombly, E. V. W. Rossiter, H. B. Ledyard, E. D. Worcester, W. C. Brown and W. J. Calhoun. Mr. Shonts retires from the Presidency, and it is understood that the jurisdiction of W. C. Brown, Vice-President and General Manager of the L. S. & M. S., will be extended over the I. I. & I.

Kansas Southwestern.—E. L. Kingsbury has been appointed Secretary and Auditor, and W. E. Wilcox, Treasurer, with headquarters at Arkansas City, Kan.

Miller County.—The officers of this company are: President and Treasurer, F. M. Pease; Vice-President and Secretary, W. W. Taberner, and Assistant Secretary, George H. Monahan. (See R. R. Construction column.)

Missouri, Kansas & Texas.—E. M. Collins has been ap-

pointed General Superintendent, with headquarters at St. Louis, Mo., succeeding M. Sweeney, resigned.

Montour.—James E. Simons has been appointed General Manager of this company and the Pittsburgh & Moon Run, with headquarters at Montour Junction, Pa. After Feb. 1, all United States mail for Mr. Simons should be sent to Cornopolis, Allegheny County, Pa., and all railroad mail should be sent to Montour Junction.

Pennsylvania.—The following appointments have been made to take effect Feb. 1: Frank P. Abercrombie, heretofore Superintendent of the Amboy Division, becomes Superintendent of the New York Division, succeeding R. M. Patterson. Victor Wierman, heretofore Superintendent of the Frederick Division, Superintendent of the Amboy Division; and Joseph B. Baker, Jr., heretofore Assistant Engineer of the Philadelphia Division, succeeds Mr. Wierman. John S. Ruth, heretofore Assistant Auditor of the Northern Central, becomes Assistant Auditor of Coal Freight Receipts of the Pennsylvania.

Phillipsburg Ry. & Quarry.—J. F. Shearer has been elected President, succeeding the late E. L. Bond.

Pittsburgh & Moon Run.—(See Montour.)

Reid Newfoundland.—H. B. Curtis has been appointed General Superintendent of the Express Department in connection with this company's railroad and steamship system, which will be known as the Newfoundland Express Company. H. McNeil has been appointed Auditor, with headquarters at St. John's, N. F. H. A. Morine becomes General Passenger Agent. D. Sutherland succeeds Mr. Morine as General Freight Agent.

Rutland.—G. W. Kenney has been appointed Superintendent of Motive Power and Rolling Stock. T. J. Reed becomes Assistant Superintendent of Motive Power, and C. J. McMaster Assistant Superintendent of Rolling Stock. The position of Master Car Builder has been abolished, effective Jan. 20.

St. Louis, Iron Mountain & Southern (Missouri Pacific).—A. S. Grant, heretofore Master Mechanic of the Houston East & West Texas, has been appointed Master Mechanic of the St. L., I. M. & S., with headquarters at Little Rock, succeeding J. T. Stafford, assigned to other duties.

St. Louis Merchants' Bridge Terminal.—(See Terminal R. R. Association of St. Louis.)

Seaboard Air Line.—At a meeting of the Board of Directors held recently A. S. Cochrane was elected a Director, succeeding his father, the late W. F. Cochrane.

D. H. Barger, heretofore Claim Agent of the Norfolk & Western, has been appointed Superintendent of the Second Division of the S. A. L., succeeding F. K. Huger, resigned. (See Southern.)

Southern.—F. K. Huger, heretofore Superintendent of the Second Division of the Seaboard Air Line, has been appointed Superintendent of the Charleston Division of the Southern, succeeding A. G. Jones, who has been transferred to the Washington Division as Superintendent, with headquarters at Charlottesville, Va.

Tennessee Coal, Iron & Railroad.—John Dowling, Division Superintendent, with headquarters at Bessemer, Ala., has resigned.

Terminal R. R. Association of St. Louis.—Owing to the death of John W. Taylor, Chief Engineer, H. J. Pfeiffer, as First Assistant Engineer, will have charge of maintenance of way and structures and of all matters pertaining to the Engineering Department of this company and the St. Louis Merchants' Bridge Terminal.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALBANY & NORTHERN.—Surveys are reported for an extension 35 miles long, from the present terminus of this railroad at Cordele, Ga., to Hawkinsville, and it is said that the prospects of building are good. The road is at present in operation between Cordele and Albany, Ga., 35 miles.

ATLANTIC & LAKE SUPERIOR.—An officer writes that this line in Quebec is now being operated by the bondholders who are completing it to the 100th mile. This work will be finished early in the summer. Charles K. Scoles is the contractor. After this it is the intention of the bondholders to ask permission from Parliament to build on as far as Fort Daniel.

BELLINGHAM BAY & EASTERN.—An officer writes that the extension from Lake Whatcom to Wickham, Wash., 15 miles, and the one between Whatcom, Wash., and Fairhaven, two miles, are completed. The remainder of the proposed extension from Sumas, Wash., to Ruby Creek, 75 miles east, of which 15 miles has been completed, is still under consideration by the directors. G. G. Donovan, General Superintendent.

BOONE, ROCKWELL CITY & NORTHWESTERN.—In addition to this company's proposed extension from Gowrie to Rockwell City, Iowa, it has been decided to extend the road from the Southern terminus at Fraser, to Newton, Jasper County, a distance of 65 miles. Hamilton Browne is President.

CALIFORNIA EASTERN.—An officer writes that what is known as the Ivanpah extension between Ivanpah and Manvel, 12 miles, was completed Jan. 16, 1902. This line is projected between Ivanpah and Goffs, 40 miles, but there are no plans at present for building beyond Manvel.

CANADIAN PACIFIC.—Application is being made of the Canadian Parliament for an act authorizing a 24-mile extension from a junction with the North Shore Railway, to run northwest to Shawenigan Falls and thence northeast to Grand Meré, with power to issue bonds for its construction which shall be a first lien on the road.

CANE BELT.—An officer writes that this company has laid 25½ miles of track during the past year between Wharton and Bay City, Texas. No new work is at present under contract, but surveys have been made from Bay City to Quintana, Texas, 45 miles. Address W. T. Eldridge, Eagle Lake, Texas.

CHICAGO & CINCINNATI.—This company has been incorporated in Indiana, with a capital stock of \$50,000, to build a road from a junction with the Cincinnati, Richmond & Muncie, to a Chicago connection.

CHARLOTTE, MONROE & COLUMBIA.—An officer writes that about 10 miles of this new railroad in North and South Carolina have been completed and that eight miles more are to be let soon. Ernest Williams, of Raleigh, N. C., is Vice-President.

CHICAGO, ROCK ISLAND & PACIFIC.—An officer writes that grading is completed on the extension from Enid, Okla. T., to Watonga, 60 miles, by way of Ringwood, O'Keene and Hitchcock. It is also proposed to extend from Watonga to Anadarko, and from Lawton, Okla. T., 25 miles in a southwesterly direction, and the prospect of building soon on these last-named extensions is good.

COLORADO ROADS.—It is officially stated that the current press reports of the new railroad to be built in Colorado between Steamboat Springs, Middle Park and other sections, are erroneous, and that no such work is planned at the present time.

COLUMBIA SOUTHERN.—Articles of incorporation have been filed in Oregon, for a company known as the Columbia Southern Ry. Extension, for the purpose of extending the line of the Columbia Southern from its present terminus at Shaniko, to Bend, about 100 miles distant, with branches to Ashwood and Prineville. This extension will run in a southerly direction to Shaniko. The line is at present in operation between Shaniko and Biggs, 70 miles. E. E. Lytle, Portland, Ore., is President.

DANSVILLE & MOUNT MORRIS.—It is said that this line, which extends between Dansville and Mount Morris, N. Y., 15 miles, with trackage over the Erie from Mount Morris to Rochester, is to be entirely overhauled this year, and put in first-class condition. The work will include new bridges, the placing of trestles, raising of track on the flat lands and gravel ballasting.

DENVER & RIO GRANDE.—It is said that about \$75,000 is to be spent this year in improving the terminals at Pueblo, Colo. Work is to begin at once on enlarging the yards east of the Union Depot.

DUBUQUE & WESTERN.—This company was organized in Clinton, Iowa, last week, with a capital stock of \$25,000, to build a railroad from Dubuque, Dubuque County, Iowa, to Boone, Boone County, a distance of 175 miles. H. W. Seaman, of Clinton, Iowa, is President.

ELGIN, JOLIET & EASTERN.—This company has bought a strip of land in Chicago, 1,950 x 50 ft., on which it is proposed to lay side tracks and provide traffic accommodations for various industries on the Calumet River.

EL PASO & SOUTHWESTERN.—An officer writes that this company's proposed route is from Benson, Ariz., by way of Bisbee and Douglas, Ariz., and Lordsburg Junction, N. Mex., to El Paso, Texas, 280 miles, with a proposed branch from Deming, N. Mex., to Deming Junction, 31 miles, and from Deming Junction to El Paso, 92 miles. The line is under contract at present between Deming Junction and Douglas, 124 miles. Grading on this section is entirely completed, and track has been laid on about 100 miles. James Douglass, of New York, is President, and W. D. Choate is General Superintendent and Traffic Manager. W. H. Leffingwell is Chief Engineer.

FREMONT, ELKHORN & MISSOURI VALLEY.—Location is said to have been made for this company's new line northwest from Verdigris, Neb., and it is said that work will begin at once. The contract has been let to Winston Bros., of Minneapolis. The line runs from Lynch to Spencer, thence to a point near Butte, and then north to Fairfax, in Gregory County, S. Dak. Surveys have also been made 7½ miles west from Fairfax.

GEORGIA, FLORIDA & ALABAMA.—It is reported that work is begun on the extension from Bainbridge, Ga., to Tallahassee, Fla., 42 miles south. It is thought that trains will be running between Arlington, Ga., and Tallahassee, some time this month.

INDIAN RIVER.—Application is being made by D'Arcy Scott, Ottawa, for a charter for a railroad from a junction of the existing line at or near the northern end of Lake Megantic in the counties of Beauce and Compton, Quebec, to run south along the lake to a point on the International Boundary near the River Moose.

IOWA, ST. LOUIS & DAKOTA.—Preliminary surveys of an extension of this road from Sibley's Point, Mo., to Centerville, Iowa, a distance of 35 miles, have been completed. The survey of the extension from Novinger, Mo., to Elmer, a point on the Santa Fe Line from Burlington to Kansas City, was completed some time ago and has been adopted. Work on the two extensions will commence as soon as the weather permits.

KANSAS CITY, MEXICO & ORIENT.—Profiles of the survey for 160 miles of the Panhandle & Gulf, which is the Texas corporation of this company, were filed with the State Railroad Commissioners on Jan. 20. This route is on the Red River, south of San Angelo, Texas, and Judge H. C. Hord, of Sweetwater, Texas, the company's attorney, says that rights of way for 112 miles have been acquired. Twenty-five miles of grading south of the Red River are about completed and grading is to be resumed soon at Sweetwater. (Oct. 25, p. 746.)

LAKE CHARLES & RICE BELT.—An officer writes that relocation of 20 miles of the route already surveyed between Lake Charles, La., and Gueydan is to be made some time this spring. The line is projected for 200 miles and has been surveyed between the points named, a distance of 48 miles. A. V. Eastman, Lake Charles, La., is General Manager.

LITTLE RIVER.—Contract has been let to W. Park and J. J. Condon, for 12 miles of this new line in Tennessee. Work will begin at Wallands, which is the terminus of the Maryville road, and extend to Tuckaleechee Cove. (Nov. 29, p. 832.)

MERIDIO-PELO.—It is said that this road will build some important extensions on a branch line in Yucatan during the present year. (Jan. 3, p. 14.)

MEXICAN ROADS.—Surveys are reported for a new line in Mexico from a port on the Gulf north of Tampico, to run across the States of Sonora and Sinaloa. It is the intention of the promoters to eventually extend the line as far as the International Boundary. D. Rodgers, of New York, is interested.

MEXICAN SOUTHERN.—An officer writes that there are at present 30 kilometers in operation on the Tlacotepec & Huajuapam De Leon extension between Tlacotepec and Las Pilas. It is completed also from Las Pilas to Acatlan, 45 miles, but work is progressing at the rate of a few miles per year only. No outside contracts are being let, and the work is being done by the owner, Garcia Teruel. The operation of the line, however, is in the hands of the Mexican Southern.

MILLER COUNTY.—An officer writes that grading is reported complete and rails are being laid on this new railroad in Missouri, which is to run from the Lebanon branch of the Missouri Pacific, near Alden, for three miles. It is expected that the road will be in operation March 15. (Construction Supplement, Oct. 11, p. 712.)

MOBILE & WEST ALABAMA.—An officer writes in regard to this proposed line from Mobile by way of Queensboro, Sheffield and Tuscaloosa to Florence, 350 miles, with a branch between Tuscaloosa and Birmingham, Ala., that 40 miles is being relocated between Mobile and Queensboro, and between Tuscaloosa and Florence. It is proposed to ask bids for rails and rolling stock by next May. H. Austill, Mobile, Ala., is President, and J. A. Milner, Birmingham, Ala., is Chief Engineer. (Construction Supplement, Oct. 11.)

MOBILE, JACKSON & KANSAS CITY.—An officer writes that track has been laid on 10 miles of the extension from Merrill, Miss., to Hattiesburg, 46 miles. An extension is also to be made from Augusta, Miss., to the junction of the Alabama & Vicksburg. Contracts will be let at once,

and it is hoped to begin work on it some time during February. The distance to be built is 96 miles.

MOBILE, EAST MOBILE & WATERTOWN (ELECTRIC).—An officer writes that work will be begun on this new electric line in Illinois between Mobile, East Mobile, Watertown, Rapid City and Fort Byron, 17 miles, some time this spring. C. H. Deere, of Mobile, Ill., is President and V. P. Hord, Vice-President.

MUNISING.—An officer writes that this company's entire line from the end of East Branch, Mich., north 20 miles into timber is graded and that track has been laid on four miles. H. R. Harris, of Munising, Mich., is General Manager. (Construction Supplement, Oct. 11, 1901.)

NEW YORK, NEW HAVEN & HARTFORD.—It is said that this company contemplates building a cut-off between the Waterbury, Meriden & Middletown line and the Northampton Division. It will reduce running time between New Haven and Waterbury considerably.

NORTHERN PACIFIC.—It is said that contracts will be let soon for widening the roadbed, between North Yakima and Prosser, Wash., a distance of 50 miles. As soon as this is finished the line is to be ballasted with rock.

OAXACA & EUJALA.—An officer writes that this new line in Mexico is open from Oaxaca to Ocotlan, and that the line is being extended from Ocotlan to Ejuala by its owner, Garcia Teruel. Work is progressing slowly, and there are no outside contracts being let. This line is operated by the Mexican Southern, but is independently owned.

OKLAHOMA CITY & TEXAS.—An officer writes that contract has been let to Johnson Bros., Quanah, Texas, for the new line from Oklahoma City to Quanah and Acme, Texas, 186 miles. The line is entirely located with 4 deg. curves as the maximum and 1 per cent. grades, and the work is light throughout. About 30 miles are completed at the present time. The corporate name of the company in Oklahoma is the Oklahoma City & Western. C. G. Jones, of Oklahoma City, is President, and W. P. Homan, Chief Engineer. (Jan. 10, p. 22.)

ORANGE & NORTHWESTERN.—An officer writes that grading and track laying has been completed on this new line in Texas between Orange and Buena, 35 miles. As soon as details of plans are worked out contracts will be let for 100 miles more of the proposed branch between Buena and Corsicana and between Buena and Marshall. J. W. Maxcy, of Houston, Texas, is Chief Engineer.

PHILADELPHIA & READING.—It is said that the line of the Philadelphia, Harrisburg & Pittsburgh, is to be changed for about a mile, near Williams Grove, Cumberland County, Pa., involving the elevation of tracks and building a bridge. Contract for the work has been let to Charles Nolan, of Philadelphia, and the estimated cost is \$75,000. The improvements will remove three reverse curves in connection with the crossing of the Dillsburg & Mechanicsburg.

PORTLAND & RUMFORD FALLS.—An officer writes that the entire line between Bemis and Kennebag, Me., 21½ miles, is under contract to McGregor Bros., of Rumford Falls, and that grading is practically completed as far as Mountain View, nine miles. Track laying is to begin early in the spring and this first section is to be completed by July 1. (Construction Supplement, Oct. 11.)

POWELL'S MOUNTAIN & MINERAL.—An officer writes that this projected line in Tennessee is about 95 miles long, and will extend from Lone Mountain to St. Paul, Tenn., by way of a number of intervening towns. It is proposed to use 40 miles of the old graded roadbed between Clinchport and St. Paul. Surveys have been made but contracts are not yet ready to be let. (Construction Supplement, Oct. 11.)

RED RIVER & TEXAS SOUTHERN.—An officer writes that track laying is completed on this new line in Texas, from Sherman to Fort Worth, 84 miles. Sam Lazarus, Sherman, Texas, is President.

RICHMOND & PETERSBURG ELECTRIC.—An officer writes that track laying on this new electric line from Richmond, Va., to Petersburg, 21 miles, by way of Centralia, Chester and Swift Creek, is completed, and that the line is also practically complete as regards final work on bridges and trestles. C. Warwick, of Richmond, is President and H. C. Harrison, of Petersburg, is Chief Engineer. (Construction Supplement, Oct. 11.)

ST. LOUIS, KANSAS CITY & COLORADO.—An officer writes that this new line in Missouri is under contract between Belle Vernon and Versailles, 72 miles, to H. F. Balch & Co., 115 South Fourth street, St. Louis. Two thousand men, 400 teams and nine steam shovels are at work. An extension 115 miles long between Versailles and Kansas City is to be built at once.

SALEM & PACIFIC COAST.—An officer writes that this new railroad in Oregon, which is projected from Salem to Falls City, 22 miles, and is under contract for nine miles between Falls City and Dallas, to J. S. Talbott, contemplates a further extension of 25 miles, with prospect of building soon. A. J. Porter, of Norton, Ore., is Chief Engineer.

SANTA FE, PRESCOTT & PHOENIX.—An officer writes that the 23-mile cut-off in Arizona, from a point on the main line near Ash Fork, was opened for business Dec. 29, 1901, and that grading is nearly complete on the Bradshaw Mountain extension from a point near Huron, Ariz., to the Poland-Hamilton Mine, eight miles.

SOUTHERN.—An officer writes that contracts were let last fall, to T. B. Jones, of Baltimore, for changing alignment of the Washington Division between Alexandria and Manassas. Work is now in progress, and should be completed next August. Contract was also let to T. B. Jones, Dec. 20, for a branch line 3½ miles long, from Littleton, Ala., south to the mine of the Schloss-Sheffield Coal & Iron Co. It is expected that this will be completed by May 1.

TIMPSON & NORTHWESTERN.—An officer writes that 12 miles of track have been laid on this new line in Texas between Timpson and Ragley, a total distance of about 32 miles. It is not proposed to build any more at present. W. G. Ragley, of Timpson, Texas, is President.

TOLEUA, MARQUETTE & NORTHERN.—An officer writes that this line from Toluca, Ill., 16 miles north to McNabb, by way of Custer and Magnolia, is completed. It is proposed to build some time this summer, and extend 10 miles along from Magnolia to Henry.

UNION TERMINAL.—This company has been incorporated in New York to build a standard gauge tunnel road 10 miles long between the Boroughs of Manhattan and Brooklyn. The projected route begins at a point beneath the intersection of Varick and Montrose avenues in Brooklyn, and proceeds westerly under the East River, under Fourteenth street, in Manhattan, and under the Hudson to a point on the boundary line of the States of New York and New Jersey, where connection is to be made with a tunnel built by a similar New Jersey corporation. A number of branches are proposed in Manhattan. The capital stock is \$100,000. The incorporators are: Francis H. Leggett, Frederick P. Voorhees, Roy

Stone, Chas. F. Smillie, Louis L. Stanton, Wm. C. Cox, M. E. Robinson, Appleton D. Palmer and John A. Stewart.

VINING & COLEMAN.—An officer writes that extensions for 70 miles in a northerly direction are projected, besides the original lines of the company between Coleman and Waldrup, Coleman and Abilene, and Waldrup and Austin, a total of 225 miles, of which 30 miles, between Coleman and Waldrup, is now under contract to I. F. Chaffin, of Waldrup. The line has been cleared for grading between these points, but nothing else has been done as yet beyond surveys. It is expected that bids for rails and rolling stock will be asked some time this spring.

WABASH.—An officer writes that work on the line between New Haven and Butler, Ind., 26 miles, is practically complete, and that the line will be open in a week or so. The corporate name of this extension is the Fort Wayne & Detroit. The Toledo & Chicago extension between Montpelier and Maumee, Ohio, 49 miles, is now entirely completed, and regular trains are running. (Construction Supplement, Oct. 11.)

WASHINGTON & ANNAPOLIS (ELECTRIC).—Bids have been asked for grading on this line between Chesapeake Junction, Md., and Westport, 31 miles. At Chesapeake Junction the road will join the Washington Traction Co., and at Westport it will connect with Union Rys. of Baltimore. The contract for the line from Annapolis will be let next month, and bids are to be asked soon. (Dec. 27, p. 900.)

WHEELING & LAKE ERIE.—It is said that this company will spend between \$450,000 and \$500,000 in betterments on the line between Massillon and Toledo, Ohio. These improvements include renewal of the tracks, replacing of bridges, etc.

GENERAL RAILROAD NEWS.

ATLANTA, KNOXVILLE & NORTHERN.—Mortgage has been filed by this company to secure the issue of \$2,000,000 4 per cent. gold bonds, to retire \$500,000 5 per cent. bonds outstanding, and for the proposed extension between Marietta and Atlanta, Ga.

CANADIAN PACIFIC.—An issue of \$20,000,000 capital stock has been authorized by the Dominion Government, subject to the approval of the shareholders. It is said that the proceeds will be spent as follows: New rolling stock and locomotives, \$9,000,000; double tracking, \$6,000,000; new plants and shops, chiefly at Montreal, \$1,500,000; new elevators and improvements of terminals, \$3,000,000; miscellaneous improvements, \$500,000.

DELAWARE, LACKAWANNA & WESTERN.—Redmond Kerr & Co. offer for sale \$1,000,000 of Morris & Essex, 3½ per cent. gold bonds, due 2000. These bonds are guaranteed by the Delaware, Lackawanna & Western, and are exempt from tax in New Jersey.

DETROIT UNITED.—At the annual meeting of the stockholders, on Jan. 21, the purchases of the Detroit & Northern; Detroit & Pontiac; Detroit, Rochester, Romeo & Lake Orion, and of the Wyandotte & Detroit River were authorized. Also, in place of the \$35,000,000 mortgage contemplated, a mortgage for \$25,000,000 was authorized, covering the Detroit United Ry., and its acquired suburban lines. It is estimated that this new mortgage after providing for the outstanding liens, including the purchase of the roads acquired, will afford a surplus of \$6,500,000. J. C. Hutchins, previously Treasurer of the company, was elected President in place of H. A. Everett, and the Board of Directors was increased from nine to eleven, to give representation to the committee of Cleveland bankers.

ELGIN, JOLIET & EASTERN.—Additional 5 per cent. first mortgage gold bonds of 1941 to the extent of \$500,000 have been listed by the New York Stock Exchange, making a total of \$8,352,000. The proceeds of these bonds are to be applied to the purchase of additional lines and for various real estate properties adjoining the company's land.

MEXICAN CENTRAL.—Collateral trust 4½ per cent. five year gold bonds to the extent of \$10,000,000 have been sold to a syndicate, of which the Mississippi Valley Trust Co., of St. Louis, is the head. This new issue is secured by deposit of \$16,100,000 Mexican Central 4s, and the proceeds will be used in taking up the \$6,000,000 of temporary notes issued for purchase of the Monterey and Mexican Gulf. Surplus will also be left for new work.

MISSISSIPPI & LITTLE ROCK.—This railroad, 27 miles long, in Lonoke and Prairie Counties, Ark., was sold Jan. 15 by decree of court. It had not been operated for some time, and possessed no rolling stock. The Black-Pollak Iron Co., of Chicago, were the purchasers, and the price was \$20,100. The original cost of building is said to have been \$244,000.

MISSOURI PACIFIC.—Additional St. Louis, Iron Mountain & Southern consolidated railway and land grant mortgage 5 per cent. gold bonds, due in 1931, have been listed at the Stock Exchange to the extent of \$889,000; also \$1,102,000 additional unifying and refunding mortgage gold 4s of 1929. The recent issue brings the total amount of the former bonds listed to \$36,418,000, and of the latter to \$24,195,000. The general consols have been issued at the rate of \$15,000 per mile on the main lines of the Arkansas Midland, and of the Brinkley, Helena & Indian Bay. The last-named issue is at a rate not to exceed \$12,000 per mile on the lines between Hamburg, Ark., and Luna Landing, Ark., 39 miles.

NORFOLK & SOUTHERN.—This company, formed to acquire stock of the Norfolk & Southern R. R., and the stock and bonds of the Lake Drummond Canal & Water Co., is to issue \$1,300,000 stock, and 3,500,000 5 per cent., 50-year gold bonds. The property included in this merger involves 174 miles of railroad, 30 steamers and a canal, which was reopened last year after an expenditure of \$1,150,000 in improvements.

ST. LOUIS, MEMPHIS & SOUTHEASTERN.—This company is to issue \$5,000,000 of first mortgage 4 per cent., 50-year gold bonds. The mortgage permits the certification of additional bonds, not to exceed a total of \$25,000 a mile; these bonds are issued for general expenses in connection with building and equipment of this new line, which was organized Jan. 8, and is to build from Crystal City, 30 miles, in Jefferson County, and also will take over and rebuild the Cape Girardeau & Northern; the Southern Missouri & Arkansas; the Hoxie, Pochontas & Northern and the St. Louis & Memphis, and operate the Chester, Perryville & Ste. Genevieve. (See Railroad Construction, Jan. 17, p. 50.)

SAVANNAH, FLORIDA & WESTERN.—At the annual meeting of stockholders, Jan. 15, it was decided to call a special meeting on Feb. 26, to consider and authorize an issue of 4 per cent. bonds, not to exceed in the aggregate \$31,000,000. The main object of the new issue is to retire outstanding bonds.